

Quantifying the Unmet Need in IHS/Tribal Emergency Medical Services



**A project funded by the Office of Program Planning and Evaluation,
Office of Public Health, IHS Headquarters
1999 – 2001**

Project Officer

Dr. Eric B. Broderick

Project Manager

Mountain Plains Health Consortium

Project Team

Pete Decker
Jim Flaherty, MD
Gerri LeBeau
Dave Short



AUTHORS

Pete Decker
Coordinator, IHS/GSA Shared Cost Ambulance Program
EMS Consultant
3340 Sweetwater Avenue
Phoenix, Arizona 85029
(602) 564-6684
pdecker3@mindspring.com

Jim Flaherty, MD
Navajo Area IHS EMS Medical Director
EMSC Program/IHS EMS Liaison
Tuba City Indian Medical Center
P.O. Box 600
Tuba City, Arizona 86045-0600
(520) 283-2406
jflaher1@tcimc.ihs.gov

Gerri LeBeau
EMS Program Coordinator
Mountain Plains Health Consortium
P. O. Box 187
Fort Meade, South Dakota 57741
(605) 347-7117
glebeau@heds.org

Dave Short
EMS and Injury Prevention Consultant
P.O. Box 11
Willow Creek, California 95573
(530) 629-0045
dshortresearch@yahoo.com

TABLE OF CONTENTS

TABLE OF CONTENTS	3
TABLE OF FIGURES	4
TABLE OF TABLES	4
PURPOSE	5
BACKGROUND INFORMATION	6
METHODOLOGY	13
COST ANALYSIS - PERSONNEL	18
SURVEY QUESTIONS	19
RESULTS.....	21
PART I - DATA TABULATION	21
PART II - FINDINGS BASED ON ANALYSIS OF SURVEY DATA	31
PERSONNEL - EMT RATIOS	31
AMBULANCES	38
PART III - FURTHER DISCUSSION OF RESULTS	40
NAVAJO NATION EMS	40
LIMITED NUMBERS OF ADVANCED EMTS	41
SYCUAN FIRE AND EMS, CALIFORNIA	42
TRIBAL CASINOS	42
EFFECTS OF INCOMPLETE DATA	42
TOURISTS	43
ALL-VOLUNTEER TRIBAL EMS PROGRAMS	43
ADJUSTMENTS TO EMT BASIC TOTALS AS A RESULT OF "EXCESS" EMT	
INTERMEDIATES AND PARAMEDICS	43
AMBULANCE RUNS PER 10,000 USER POPULATION	44
SURVEY LIMITATIONS	45
LEVEL OF NEED FUNDING	51
RECOMMENDATIONS	52
TO INDIAN HEALTH SERVICE	52
TO TRIBAL EMS PROGRAMS	53
FURTHER WORK THAT NEEDS TO BE ACCOMPLISHED	55
APPENDIX A -- 1993 NHTSA TECHNICAL ASSISTANCE TEAM RECOMMENDATIONS.....	56
LISTING OF ALL SIXTY-SEVEN (67) RECOMMENDATIONS	56
APPENDIX B: TRIBAL EMS DATA SUMMARY	65
ELEMENTS—PART I	65
APPENDIX B, PAGE 2.....	66
ELEMENTS—PART II	66
APPENDIX C - GRAPHS.....	67

TABLE OF FIGURES

FIGURE 1 - INTERVIEW DATA FORM	20
FIGURE 2 - TRIBAL EMS PROGRAM DATA PROFILE.....	22
FIGURE 3 - TOP TEN PROGRAMS BY RUN VOLUME.....	29
FIGURE 4 -TOTAL COSTS TO CORRECT EMT DISPARITY BY IHS AREA.....	38
FIGURE 5 - NAVAJO NATION EMS EMTs NEEDED FOR STATE PARITY	41
FIGURE 6 - STATE EMT BASIC PER 10,000.....	48
FIGURE 7 -STATE EMT INTERMEDIATE PER 10,000	49
FIGURE 8 - STATE EMT PARAMEDIC PER 10,000	50
FIGURE 9 - TOTAL COSTS TO CORRECT EMT DISPARITY	67
FIGURE 10 - COST TO CORRECT EMT BASIC DISPARITY	68
FIGURE 11 - COST TO CORRECT EMT INTERMEDIATE DISPARITY	69
FIGURE 12 - COST TO CORRECT EMT PARAMEDIC DISPARITY.....	70
FIGURE 13 - STATE EMT B RATIO PER 10,000 POPULATION.....	71
FIGURE 14 - STATE EMT I RATIO PER 10,000 POPULATION	72
FIGURE 15 - STATE EMT P RATIO PER 10,000 POPULATION.....	73

TABLE OF TABLES

TABLE 1 - PERCENTAGE INCREASE IN IHS USER POPULATION 1984-1998 BY AREA.....	12
TABLE 2 - PERCENTAGE INCREASE IN IHS USER POPULATION 1984-1998 BY AREA.....	12
TABLE 3 - DIFFERENCE IN STATE AND TRIBAL EMT RATIOS	17
TABLE 4 - ANNUAL SALARIES FOR FEDERAL EMPLOYEES.....	18
TABLE 5 - CONTACT INFORMATION	21
TABLE 6 - FINANCIAL CONTRIBUTIONS BY SOURCE.....	23
TABLE 7 - EMT STAFFING.....	24
TABLE 8 - EMT SALARY COMPARISON.....	25
TABLE 9 - EQUIPMENT NEEDS.....	26
TABLE 10 - NUMBER OF EMTs PROVIDED INITIAL TRAINING IN 1999	27
TABLE 11 - AMBULANCES PER IHS AREA	27
TABLE 12 - METHODS OF PROVIDING MALPRACTICE INSURANCE	28
TABLE 13 - THIRD PARTY BILLING FOR SERVICES.....	28
TABLE 14 - YEARLY AMBULANCE RUNS.....	29
TABLE 15 - RANGES AND MEANS OF STATE EMT RATIOS	33
TABLE 16 - TRIBAL EMS PROGRAM RATIOS BY AREA.....	34
TABLE 17 -TRIBAL EMS PROGRAM RATIOS BY AREA (CONTINUED).....	35
TABLE 18 - MEAN RATIOS OF EMTs PER 10,000 POPULATION BY IHS AREA	36
TABLE 19 - MEAN RATIOS OF EMTs PER 10,000 POPULATION	36
TABLE 20 - EMTs NEEDED FOR RATIO PARITY BY AREA	37
TABLE 21 - COSTS TO ACHIEVE EMT RATIO PARITY BY AREA.....	37
TABLE 22 - AMBULANCE COSTS.....	38
TABLE 23 - ALL VOLUNTEER TRIBAL EMS PROGRAMS	43
TABLE 24 -YEARLY AMBULANCE RUNS PER 10,000 SERVICE POPULATIONS.....	44
TABLE 25 - RATIOS OF EMTs PER 10,000 POPULATION.....	50

PURPOSE

The purpose of this report is to present data collected from Tribal Emergency Medical Services (EMS) programs, report their unmet needs, and make suggestions for future resource allocation by the Indian Health Service (IHS).

It is worth noting that two years prior to the initiation of this project; the IHS contracted with one of the authors of this report for a similar, but more focused investigation. It resulted in an unpublished report entitled An Assessment of Capabilities of American Indian Tribal Emergency Medical Services to Address EMS for Children (1998)¹. Because it is assumed that EMS for Children (EMSC) activities and program goals occur within the larger EMS system, the information in both of these reports should be considered concurrently; each complements, and reinforces the other. The authors hope that these documents will generate further interest, support, and critically needed resources for tribal EMS programs.

BACKGROUND INFORMATION

Prior to this survey, there has been one system evaluation of a sample IHS EMS Programs². In 1993, DHHS/IHS requested a Technical Assistance Team (TAT) be convened by the National Highway Traffic Safety Administration (NHTSA) to provide an evaluation, or system review, of the IHS EMS Programs. The format for evaluation and reporting was quite different from the survey tool used in the present report. Members of the TAT used evaluation standards that were developed to assess state EMS programs with regard to ten usual system components; they reported sixty-seven (67) overall recommendations, with twenty-six (26) of them highlighted as major, or priority recommendations. These recommendations are included as Appendix A. Most of these recommendations have not been acted upon, due to recent trends of decentralization within the IHS and corresponding reductions in the administrative staff³.

EMS includes a spectrum of activities: injury prevention, prehospital response, inter-facility transport, professional training, community education, information systems and evaluation, but is not limited to these categories. Formerly referred to as components, the **fourteen attributes of EMS** are now defined in the EMS Agenda for the Future⁴, an important planning document published by NHTSA and HRSA in 1996. "Integration of Health Services" is the first attribute identified for development. The Agenda's Vision Statement begins as follows: "Emergency Medical Services (EMS) of the future will be community-based health management that is fully integrated with the overall health care system." This document, which was used as a reference in preparing this report, defines EMS in terms of "where we are," "where we want to be," and "how to get there." The text that follows defines where we are and where we should be in terms of resources for tribal EMS programs, and provides recommendations on how to get there.

Before describing the characteristics of tribal EMS programs, it is important to acknowledge that there are numerous and significant differences between urban and rural EMS systems. The most obvious differences are related to dispatch and response capabilities. In urban systems, citizens access enhanced 911 systems with automatic number identity (ANI) and automatic location identity (ALI). Certified Emergency Medical Dispatchers (EMD), aided by computers, give pre-arrival instructions while activating Basic Life Support (BLS) First Responders and secondary Advanced Life Support (ALS) crews. In rural systems, citizens (those who have phones) call 911, if 911 service is available in their particular community; it is not available universally. Local law enforcement dispatchers typically answer calls to 911 or to other emergency numbers. These dispatchers obtain location information and details of the incident; they usually are not trained or certified to give pre-arrival instructions. They activate EMS, which usually consists of primarily BLS and limited ALS responders. In addition to differences in dispatch and response capabilities, there are differences in types of patient calls and outcomes. For example, it is well known that high

motor vehicle crash death rates correlate with low population density. Death rates in rural counties are many times higher than in adjacent urban areas⁵.

While two-tiered urban EMS systems have been the focus of increasing analysis and prehospital research over the last two decades, it was only recently that the Health Resources and Services Administration (HRSA) and the Office of Rural Health Policy have begun to collaborate with the National Rural Health Association (NRHA) regarding the unique needs of rural EMS⁶. As a result of this collaboration, the process of examining, defining, and planning for these needs has begun⁷.

Overall, tribal EMS programs serve reservation communities and their User Populations, adjacent communities, and seasonal visitors in isolated rural areas with long response and transport times. In addition to this geographic isolation, other factors that regularly affect operation of tribal EMS systems include insufficient health manpower (including backup personnel), substandard road conditions, inadequate and sometimes unsafe landing areas for aircraft, lack of certified Emergency Medical Dispatchers, and radio communication dead spots. All of these factors contribute to a very challenging work environment for EMTs practicing in any rural or frontier area.

The majority of the 562 federally recognized Tribes do not have their own EMS programs. While it is not known how the members of these Tribes obtain emergency medical services, it is assumed that they rely, as everyone does, on existing local public (city or county) and private ambulance services to access EMS; the volume of such calls and their associated costs are unknown. **In contrast, seventy-seven (77) tribal EMS programs exist within eleven of the twelve IHS Areas⁸.** These programs served 46% (642,388 of 1,400,170) of the IHS User Population in FY 98. Some tribal EMS programs are First Response organizations whose personnel stabilize patients and wait for non-tribal ambulances to transport. Other tribal EMS programs limit their scope of work to prehospital response and transport (usually to an IHS facility); while others provide both prehospital and inter-facility transports. Regardless of individual program variation in scope of work, tribal EMTs respond to the same medical and injury-related calls that any EMT does in his or her respective service area. The nature, frequency, and acuity of those calls generally reflect the health status and needs of the community members.

Specific mortality data from Regional Differences in Indian Health, 1998-99⁹, gives insight into the health status and EMS needs of native communities.

- **The Five Leading Causes of Death** (FY 1992-4) for American Indian and Alaska Natives of all ages were (in order) **diseases of the heart, malignant neoplasms, accidents, diabetes mellitus, and chronic liver disease and cirrhosis.**

- Within the 25-44 year age group, the two Leading Causes of Death are accidents, and chronic liver disease & cirrhosis.
- The **age-adjusted alcoholism death rate** (CY 1994-96) for the IHS Service Population was 48.7/100,000, which is **seven** times the rate for the 1995 US All Races population of 6.7/100,000.
- For ages 1-45, the **rate of death from accidents** for American Indians and Alaska Natives was 94.5/100,000, which is **three** times the rate for US All Races population of 30.3/100,000 for FY 1992-94.

It should be noted that **suicide and homicide are not included in the older classification of “accident”** and are listed as separate Causes of Death. In terms of Leading Causes of Death for all ages, these rank eighth and tenth. Both suicide and homicide now comprise the **newer classification of “intentional injury.”** **If one were to reclassify the former categories of accidents, suicide and homicide into the more current definition of injury, the ranking of leading Causes of Death for all ages would change. Injury, both intentional and unintentional, would then replace malignant neoplasms as the second leading lifetime cause of death.** Injuries have an enormous impact on the lives of Native Americans, especially among young and middle aged males. Every year that a young person would have lived between their death by injury and their projected life expectancy is a Year of Potential Life Lost (YPPL). Native Americans YPPL due to injuries totals surpass the all races YPPL totals of cardiac disease and malignant neoplasm combined.

More current injury data specific to infancy and childhood can be found in Injuries Among American Indian and Alaska Native Children, 1985-1996¹⁰. The executive summary states “Injuries caused the deaths of 3,554 Native American children aged 0 to 19 years residing in IHS service areas.” These fatal events represent 75% of all deaths among 1-19 year old Native Americans from 1992-1996. Analysis of these injury deaths demonstrated five particularly significant causes of injury, as quoted below:

- **Motor vehicle crashes** caused the deaths of 1,484 Native American children during 1985-1996. Rates for Native American children were almost twice the rates for white children. Childhood motor vehicle-related death rates for the Billings, Navajo and Aberdeen IHS Areas were more than three times greater than national rates.
- **Pedestrian related motor vehicle crashes** killed 367 Native American children during 1985-1996. Pedestrian death rates for Native American children were almost three times that for white children. Rates in the Albuquerque, Navajo, and Tucson IHS Areas were over five times the U.S. national rates.

- **Drowning:** 276 Native American children drowned during 1985-1996. Rates for Native American children were twice as high as rates for white children. The Alaska IHS Area rate was over six times the U.S. national rate and the rates for the Aberdeen, Bemidji, Billings, Navajo, and Phoenix IHS Areas were all over twice as great.
- **Fires:** 224 Native American children died from fire-related injuries, almost all due to house fires, during 1985-1996. Rates for Native American children were three times the rates for white children. Rates in the Aberdeen, Alaska, and Bemidji IHS Areas were five times the U.S. national rate.
- **Suicide:** 449 Native American children committed suicide during 1985-1996. Rates for Native American children were about two and one-half times the rates for white children. The highest rates of youth suicide occurred in the Aberdeen, Alaska, and Tucson IHS Areas. These Areas had rates that were five to six times the U.S. national rates.

Overall, it is reasonable to assume that these fatality rates, particularly the increased injury rates, reflect a significant portion of the EMS run volume by tribal EMTs within their communities. It is also reasonable to conclude that these same EMTs do, or can contribute to Service Unit injury prevention activities as participating members of the Injury Prevention Committee. Finally, the childhood injury fatality rates noted above have significant impact for the direction of community and service area Emergency Medical Services for Children (EMSC) activities.

While these injury and alcohol related mortality statistics reflect the health status and EMS needs of the community, they do not in themselves suggest causes or give any explanation for these profoundly high mortality rates. Work in the last decade regarding generational grief proposes a framework of explanation, and has recently received national attention. In his speech¹¹ acknowledging the 175th Anniversary of the Establishment of the Bureau of Indian Affairs on September 8, 2000, Kevin Gover, the Assistant Secretary-Indian Affairs, noted that the “trauma of shame, fear and anger has passed from one generation to the next, and manifests itself in the rampant alcoholism, drug abuse, and domestic violence that plague Indian country.” He goes on to state “Many of our people live lives of unrelenting tragedy as Indian families suffer the ruin of lives by alcoholism, suicides made of shame and despair, and violent death at the hands of one another.”

This concept of **generational trauma** and its associated grief was recently defined and explored at a regional EMSC education conference in Tucson¹². The theme of the annual conference of the Intermountain Regional EMSC Coordinating Council (IRECC) was EMS/EMSC and Minority Communities. Velma Mason, Ph.D., Director for the Alcohol and Substance Abuse Program of the Office of Assistant Secretary Gover, and staff from her office spoke on

“Generational Grief: Continuing a Cycle of Illness.” The intersection of generational grief, substance abuse, and high injury rates within effected communities was explored and discussed in relation to tribal EMS response. The profound impact on individual tribal EMTs who must respond to such tragic and personal events on a daily basis has not been studied.

Tribal EMS programs are funded from a combination of four main sources: 1) IHS funds through PL 93-638 contracting or self-governance compacting, 2) contributions from tribal General Funds, 3) IHS-GSA Shared Cost Ambulance Program¹³, and 4) collections from third party billings. The amount that each of these sources contributes to the operating budget of an individual tribal program varies considerably, and in some programs, is not precisely known. Whether these combined sources of income adequately meet a program’s operating costs is also unknown. Multiple reasons exist for this uncertainty. The primary reason is related to the lack of readily available information. There is no collection or mandatory reporting of fiscal data at the Headquarters, Area Office or Service Unit levels. Another factor is the lack of reporting of expenditures specifically for EMS, when the operation of an EMS program exists within a larger, more comprehensive Tribal Health System contract.

In addition to tribal and IHS direct expenditures for EMS, both IHS and tribal Contract Health Services (CHS) funds contribute to the annual EMS outlay by paying for ground and air medical transport services. While the annual IHS expenditure for CHS-provided EMS can be ascertained from readily available Fiscal Intermediary (FI) data¹⁴, there is no similar accessible source to determine the contribution by tribal CHS.

In both the public and private ambulance sectors, most ambulance organizations utilize the income from the better-paying activity of inter-facility transports to subsidize the prehospital services provided by their business. Performing prehospital and inter-facility transports requires “certification” (or some equivalent process) by the state (EMS Bureau, or corporation or public regulatory commission). Practically speaking, a tribal EMS ambulance cannot run “off reservation” unless it has completed the certification process, except in mutual aid situations. Some state Attorneys General have concluded that such certification is not within the authority of their States. Some tribal governments view this process as a relinquishment of tribal sovereignty, whereas others do not. Consequently, willingness to participate in a state certification process varies among tribes within their respective states, and affects the ability of an individual tribe’s EMS program to bill third parties for services.

As noted above with regard to fiscal data, there is no defined method or process for the annual collection of any EMS data at the IHS Headquarters or Area Office levels. This reality reflects the lack of infrastructure for EMS at these same levels, in spite of the creation of an IHS Headquarters EMS Branch in 1996¹⁵. In addition, no current resource or staffing standards exist for rural

EMS systems. Therefore, the collection of information to assess unmet needs and to project how to meet those needs was a considerable challenge.

It has long been the assumption by those who have worked with the IHS and tribal EMS, that tribal EMS programs are understaffed, incompletely equipped and inadequately funded. While IHS appropriations for EMS contracts have remained static until the present fiscal year, the User Populations have increased steadily over the last two decades Tables 1 and 2¹⁶. It can be reasonably assumed that the number of patients who are transported has likewise increased, but there is no longitudinal data available from EMS programs to accurately quantify this increase.

FY	Aberdeen	Alaska	Albuquerque	Bemidji	Billings	California
98	118,881	113,885	85,400	86,304	72,591	63,457
97	113,064	105,540	81,052	82,652	64,780	63,210
96	112,026	103,109	80,554	81,582	63,446	64,926
95	108,874	100,132	79,875	77,525	62,395	64,340
94	107,377	97,742	78,619	66,262	61,528	63,360
93	104,443	93,722	76,253	62,057	60,021	62,569
92	103,615	87,225	74,064	58,854	59,324	58,011
91	103,953	87,307	73,338	56,451	58,625	53,675
90	103,354	87,921	71,369	50,644	55,315	52,507
89	94,541	88,314	65,872	50,311	54,849	44,259
88	94,813	85,784	67,843	55,068	51,712	45,171
87	78,677	88,511	62,284	44,837	49,800	39,866
86	75,635	76,042	53,894	48,553	44,233	43,505
85	72,679	73,351	51,363	44,337	38,470	26,640
84	70,648	71,329	50,336	43,949	37,635	26,640
% ▲	68%	60%	70%	96%	93%	138%

Table 1 - Percentage Increase in IHS User Population 1984-1998 by Area

FY	Nashville	Navajo	Oklahoma	Phoenix	Portland	Tucson
98	46,145	253,382	310,863	135,785	89,878	23,599
97	42,271	234,868	281,310	126,085	84,682	21,120
96	41,839	233,690	275,532	123,027	82,471	22,758
95	41,644	233,094	269,401	118,526	78,796	21,930
94	36,771	231,926	265,075	116,518	77,987	20,662
93	35,302	230,974	257,421	114,202	75,866	19,707
92	34,167	226,754	246,750	111,765	70,553	18,799
91	33,828	223,943	243,715	111,994	70,212	19,614
90	32,234	219,531	237,630	106,663	68,605	18,921
89	30,597	191,875	219,616	92,469	61,944	17,539
88	27,998	181,527	228,663	96,012	58,923	17,628
87	25,022	167,741	217,211	75,522	54,059	19,877
86	30,610	171,423	199,613	83,812	62,770	18,778
85	28,696	166,493	178,457	79,502	62,380	15,959
84	28,426	162,005	176,011	77,677	61,480	15,959
% ▲	62%	56%	77%	75%	46%	48%

Table 2 - Percentage Increase in IHS User Population 1984-1998 by Area

METHODOLOGY

The starting point in this study was the Tribal EMS/Ambulance Programs Directory that was first compiled in 1994 by the IHS and is now maintained on the Mountain Plains Health Consortium (MPHC) web site at www.heds.org/ambprog10.pdf. There are 77 EMS programs listed at present. The Directory does not include EMS programs in Alaska.

Of the 77 EMS programs listed in the Directory, 64 programs are known to operate one or more ambulances and transport patients. Another 13 non-transporting tribal EMS programs are listed in the Directory. Although many of these programs were contacted, their information was excluded from the study.

A structured telephone interview was used to gather information. Project team members called 53 programs and interviewed the program director. In two additional instances a senior EMT supplied the data. The project team members completed an individual data form for each program. The form used to conduct the interviews and to record program data is reproduced as Figure 1 at the end of this section.

To answer the question, “what should the system be,” we attempted to locate staffing and ambulance standards for EMS systems in the EMS general population. The standards would specify when an ambulance service is needed in quantifiable terms (i.e., populations or geographic area to be served). The standards would further identify measures to help system planners determine how many ambulances are needed, the locations at which they should be based, how many EMTs are needed, what level(s) (i.e., Basic, Intermediate, Paramedic) they should be certified to (and operate at), and other determinative factors.

We attempted to locate these standards in the following ways:

- by contacting federal and state government agencies, and professional organizations, with EMS responsibilities and expertise
- by checking websites of professional and accrediting organizations
- by completing a computer literature search
- by reading published literature and reports

Many EMS agencies and organizations, and recognized experts in the field of EMS within their offices were contacted, and no staffing standards were identified. Contacts included the following organizations:

- National Highway and Traffic Safety Administration (NHTSA)
- National Association of State EMS Directors (NASEMSD)
- Commission on the Accreditation of Ambulance Services (CAAS)
- American Ambulance Association (AAA)
- The Abaris Group
- UCLA Center for Prehospital Care
- Journal of Emergency Medical Services (JEMS)

- Twenty state EMS Bureaus of the 35 Reservation States

The websites of the following organizations were checked as well:

- The American Society for Testing and Materials (ASTM), Committee F30, Emergency Medical Services (www.astm.org)
- Commission on the Accreditation of Medical Transport Systems (CAMTS) (www.camts.org)
- American College of Surgeons (ACS) (www.acs.org)
- American College of Emergency Physicians (www.acep.org)
- National Fire Association (NFA) (www.nfa.org)
- EMS-Research Agenda for the Future (NAEMSP/NHTSA joint project) (www.emermed.uc.edu/ResearchAgenda)

A Medline search through the National Library of Medicine was completed using the Medical Subject Headings (MeSH): 'health manpower,' 'emergency medical services,' and 'rural health services.' Although the search produced numerous citations, there were no specific articles or cited publications on quantitative staffing standards for EMS systems.

In the late 1980's and early 1990's, California¹⁷, North Dakota¹⁸, Oklahoma¹⁹ and Virginia²⁰ examined the needs of rural EMS systems, and published reports and guidelines regarding establishing and maintaining ambulance service in the remote and rural areas of their states. The 1988 Oklahoma report states clearly the assumption, which is common to all of these analyses: "An adequate number of qualified, well-trained personnel are needed to make the system operate efficiently." While all of these reports emphasize the significant problems of 1) heavy reliance on volunteer personnel, 2) skills attrition associated with low call volume, and 3) recruitment and retention, none of them identified existing staffing standards which they utilized.

Several other often cited EMS documents were reviewed as well: the "Emergency Medical Services Systems Guidelines" (1979)²¹, Rural Emergency Medical Services (1989)²², and Success and Failure: A Study of Rural Emergency Medical Services (1990)²³. The first was the principal guide for development of comprehensive emergency medical services systems throughout the country following passage of the EMS Systems Act and other Congressional Acts (Public Laws 93-154, 94-573, and 95-626). This document contains no specific standards for staffing ambulance programs for a given population, and no mention or reference to standards in other documents of that time. The second citation is a Special Report of the Office of Technology Assessment of Congress. While it suggests the establishment of federal legislation to facilitate the development of national consensus guidelines or standards for prehospital providers, it does not identify existing staffing standards. Finally, the National Rural Health Association's study emphasized the shortage of volunteer personnel, limited training opportunities, and inadequate funding in regard to

EMS staffing in rural areas, and did not address the issue of lack of staffing standards.

In most states, an ambulance service must obtain a Certificate of Need/Necessity (CON) from a regional or state authority to operate legally within that jurisdiction. Discussion with several state EMS offices revealed that CONs are issued to the first applicant for a particular geographic area who claims that there is a need sufficient to operate an ambulance service. But there are no state rules or standards on how many ambulances are required for a given population served or a specific geographic area served.

In some states, tribal ambulance services do not or cannot apply for CONs. For example, the Attorney General of Arizona has issued an opinion that the State of Arizona does not have jurisdiction over ambulance services operated by federally recognized tribes and operating on the tribal reservation. The State EMS agency therefore cannot license tribal ambulance services or require them to meet Arizona state standards for ambulance vehicles or for the number of staff or patient care equipment within them. On the other hand, any tribal EMS program can voluntarily meet the State requirements for ambulance service licensure, and many do.

In summary, none of the various sources examined could identify rural EMS staffing standards that are widely known, accepted or utilized in the national EMS community.

With no model to follow or standard to measure against, the authors chose to estimate unmet need for EMS by comparing critical features of tribal EMS programs with data from state EMS offices. In the absence of quantitative standards, we elected to make comparisons based on measurable features such as numbers of ambulances, number of EMTs and their certification levels, etc., and the resident population served. We compared individual tribal EMS programs with the states in which their primary patient populations reside.

We obtained, from on-line access to US Census Bureau data²⁴, 1998 official population estimates for each state in which one or more tribal EMS programs operate. State EMS Bureaus in these states were contacted for a count of their EMTs. The only count of EMTs available for each state was the number of EMTs (Basic, Intermediate, and Paramedic) in each category licensed in year 1999 in that state. State EMS offices only keep records of the current status of an EMT's certificate; those offices do not know whether an EMT is actually an active member or employee of an ambulance service, fire department, or other organization. We recognize that the number of licensed EMTs in a state is probably greater than the number of EMTs that are actually providing care. However, these numbers were the only ones available.

We computed ratios of numbers of EMTs per 10,000 population by dividing the number of EMTs of each level by the US Census population of each state, and

multiplying by 10,000. The ratio of EMTs per ten thousand population became the key element in the analysis. The next step was to compute ratios for tribal EMS programs in terms similar to those for States. Tribal EMS programs supplied the number of EMTs in each level (Basic, Intermediate, and Paramedic) employed Full Time (Career) or Part Time (Paid & Volunteer). Therefore, we compared ratios for individual tribal EMS programs only with ratios for the specific state in which the programs operate. We also chose to standardize all ratios in terms of numbers per ten thousand population, even when the total tribal population served was much less (e.g., 600).

For the purposes of developing parity ratios of EMTs between the Reservation states and tribal EMS, Full time EMTs, Volunteers, and Part time EMTs were all considered to be equally available for emergency and callback duty. The reported numbers of full and part time/volunteer were combined for each EMS program into single values ("Number of EMTs") for EMT Basics, Intermediates, and Paramedics. This was done to offset the unknown number of certified but inactive EMTs in each state.

After obtaining totals for EMT Basics, Intermediates, and Paramedics, these values were divided by the FY 1998 IHS User Population²⁵ for the IHS Service Unit associated with each individual tribal EMS program. The resulting quotient was multiplied by 10,000 to give a ratio of EMTs per 10,000 population.

EXAMPLE

The following example considers the Oglala Sioux Tribal Ambulance Service, Pine Ridge, South Dakota, which serves the Pine Ridge Reservation and is associated with the Pine Ridge IHS-Service Unit in the Aberdeen Area:

Number of full time EMT-Basics = 23
Number of part time/volunteer EMT-Basics = 0
IHS User Population = 22,577

Ratio (Number of EMT-Basics per ten thousand population

$$\text{to IHS User Population}) = \frac{(23+0) \times (10,000)}{22,577} = \mathbf{10.19}$$

To compute levels of personnel needed to achieve EMT parity with the state, the ratios of EMTs at each of three levels of certification for each tribal program were subtracted from the corresponding ratios for the states. For example, for Pine Ridge:

Certification Level	State (South Dakota) Ratio	Tribal EMS Ratio	Difference in Ratios
EMT-Basic	42.22	10.19	32.03
EMT-Intermediate	3.12	0.44	2.68
EMT-Paramedic	2.85	2.66	0.19

*Table 3 - Difference in State and Tribal EMT Ratios
(for Pine Ridge Example)*

The ratios of tribal EMT Basics, Intermediates and Paramedics are all significantly below State ratios in this example. Although the example calculation addresses only EMT Basics, parity with the State of South Dakota will require obtaining EMT Intermediates and Paramedics as well.

Using the differences between the State ratio and the tribal EMS ratios (rightmost column above), the numbers of personnel needed by each tribal EMS program to achieve EMT ratio parity was computed by the following formula:

$$\text{Number of EMTs Needed} = \frac{(\text{Ratio Difference}) \times (\text{User Population})}{10,000}$$

For the Pine Ridge EMT-Basic example, the Number of EMTs needed is given by substituting in the above formula:

$$\text{Number of EMTs Needed} = \frac{(32.03) \times (22,577)}{10,000} = \mathbf{72.2}$$

Thus 72 EMT-Basic Full Time Equivalents (FTEs) would have to be added to the existing staff of full time and part time/volunteer EMT-Basics at the Oglala Sioux Tribal Ambulance Service to achieve EMT parity with the state of South Dakota.

COST ANALYSIS - PERSONNEL

To estimate the cost of achieving EMT parity with the states, the cost of an EMT position was estimated for each of the three levels by using the US Civil Service salaries established by the US Congress for use by all Federal Government agencies²⁶. EMTs in the Federal Civil Service at IHS and other agencies in the US are generally classified in the Health Technician (GS-601) Series, at the approximate levels of compensation shown below:

Level	GS Rating (Pay Grade/Step)	Approximate Annual Salary
EMT-Basic	4/5	\$23,116
EMT-Intermediate	6/5	\$28,826
EMT-Paramedic	7/5	\$32,032

Table 4 - Annual Salaries for Federal Employees

The formula for calculating costs of achieving parity with the state for any tribal EMS program is stated:

$$\text{Cost} = (\text{Number of EMTs Needed}) \times (\text{Annual Salary}) \times (\text{Benefit Allowance})$$

For the Oglala Sioux Tribal Ambulance Service for EMTs-Basic (alone) the cost for annual salaries (alone) would be:

$$\text{Cost} = (72) \times (\$23,116) = \$1,664,352$$

Applying the standard Federal benefit allowance of +25%,

$$\text{Cost} = (\$1,664,352) \times (1.25) = \mathbf{\$2,080,440}$$

Note that the costs computed using this procedure are salary and benefit costs *only* and do not include the costs of training and certification or the costs of providing the additional equipment, ongoing re-certification training, and other significant costs associated with an increased number of employees.

This procedure was repeated for all levels of EMTs for all tribal EMS programs for which data were available. The results of these calculations are presented in the Results section of this report.

Survey Questions **Quantifying Unmet Needs Survey, 1999-2000**

1. What are the total expenditures for your program? \$ _____
 From what sources did these funds come?
 - a. IHS (638 & other contract): \$ _____
 - b. Tribal funds: \$ _____
 - c. Other (3rd party, etc.): \$ _____

Skip question # 2 if # 1 is answered.

2. If total expenditures are unknown, what, approximately, is expended for
 - a. personnel \$ _____
 - b. equipment \$ _____
 - c. training \$ _____
 - d. supplies \$ _____
 - e. ambulance \$ _____
 - f. insurance (malpractice, workman's comp, other) \$ _____

Skip question # 3 if these data have already been collected from previous survey.

3. How many EMTs do you currently employ (*ask this question only of programs that have not previously answered this question*)? What is their status [full time/career, part-time/call or volunteer]? For volunteers, please report active members (those involved in patient care) only.

	<u>Full-time</u> <u>(career)</u>	<u>Active part-time</u> <u>(Call or Volunteer)</u>
a. # of EMT-Basic	_____	_____
b. # of EMT-Intermediates	_____	_____
c. # of EMT-Paramedics	_____	_____

4. What is the average salary (approximate) for

a. EMT-Basic	\$ _____	\$ _____
b. EMT-Intermediate	\$ _____	\$ _____
c. EMT-Paramedic	\$ _____	\$ _____

5. Do your ambulances have all patient care equipment needed to meet State standards at the level (BLS or ALS) at which they are operated? What equipment do you need (Unmet Needs)?
 - a. BLS service
 - b. ALS service
6. How many staff did you put through initial training, not continuing education, in the past year?
 - a. # in BLS training _____
 - b. # in ALS training _____

Skip question # 7 if the program has previously answered the question.

7. How many ambulances are staffed and in service? _____
8. How is your malpractice insurance covered? (check one)
- a. you buy malpractice insurance _____
 - b. you are self-insured _____
 - c. you are covered by Federal Tort Claims Act (638) _____
9. Are you doing Third Party Billing?
10. Does your Program get to keep revenue generated by Third Party Billing? How many ambulance runs did your program make last year?
11. The official IHS Service Population for your Service Unit is: _____ Is this the number of people your program serves? _____ If not, what is the correct number and how many of them are Native American and how many are non-Native?
-

Figure 1 - Interview Data Form

RESULTS

The Results section is divided into three parts. The first (Part I) presents data from direct tabulation of responses to questions in the survey instrument. The second (Part II) presents findings based on analysis of the survey data. The third (Part III) is a discussion of specific information derived from the analysis.

PART I - DATA TABULATION

There are 77 tribal EMS programs in the 48 contiguous United States. Sixty-four (83%) of these transport patients. Of the 64 programs that transport patients, 55 (86%) provided at least some data. Contact with the remaining nine (14%) of these 64 programs could not be established. Of the 55 programs that provided data, 10 supplied incomplete needed data on EMT staffing. Another four programs supplied EMT staffing data, but no official IHS User Population figure could be obtained for the tribe or community served. These numbers are represented pictorially in Figure 2 below. Effects of this situation on the study are discussed further in Part III of the Results section.

Note that this study is limited to transporting programs within the contiguous United States only. In Part I, data from all 55 programs were tabulated. If data from a program were incomplete, whatever was available was used if at all possible.

Total EMS Programs Identified	77	100%
Total Transporting Tribal EMS Programs	64	83%
Total EMS Director Contacts used in results	55	86%
Total State EMS Director Contacts	21	87.5%

Table 5 - Contact Information

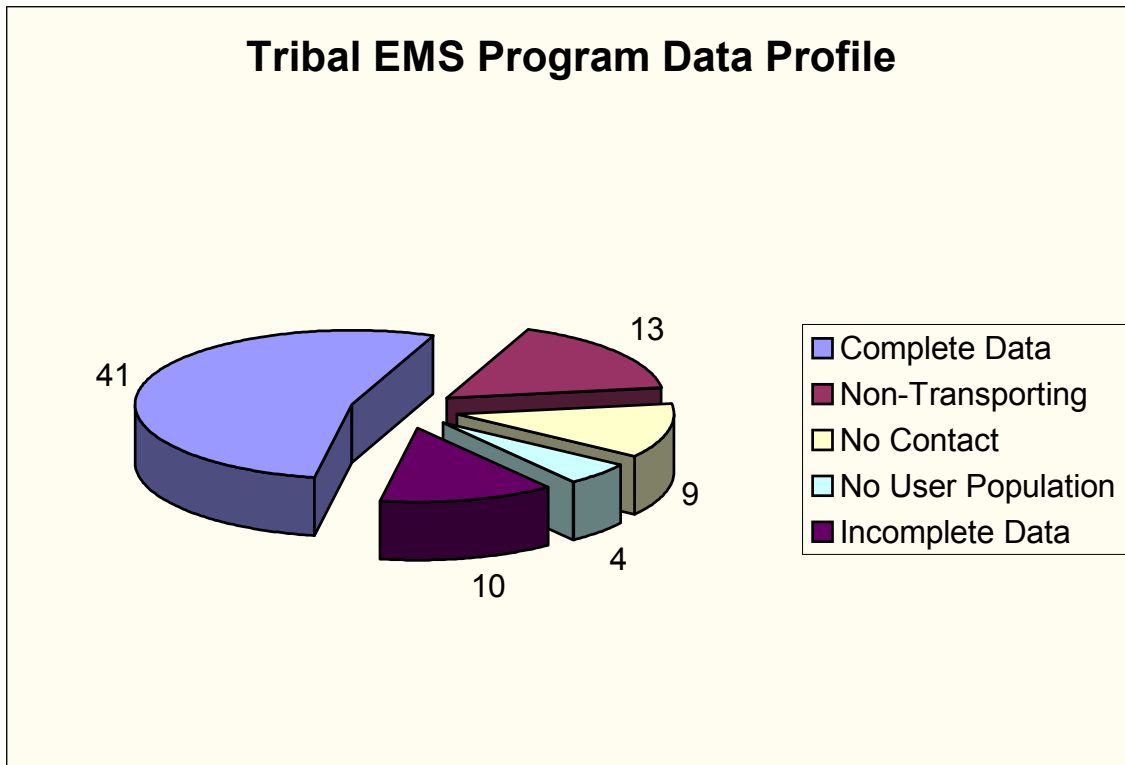


Figure 2 - Tribal EMS Program Data Profile

There are 77 tribal EMS programs. 13 of these do not transport patients and were excluded completely from the study. Figures for unmet need presented later in the Conclusions section of this report do not include any projection of funds needed for non-transporting EMS programs.

There are 64 tribal EMS programs that transport patients. 41 of these provided complete EMT staffing data. Contact could not be established with, nor data obtained about, nine programs; no User Population figures were available for four programs; and incomplete EMT staffing data were supplied by another 10.

To calculate unmet need for all 64 transporting tribal EMS programs, we used data from the 41 programs that provided complete staffing data (64% of 64) to project the need for all 64 programs. The total cost of additional EMTs needed by all 64 programs is given by solving the ratio below:

$$\frac{41}{64} = \frac{(\text{cost of additional EMTs needed by 41 programs})}{(\text{cost of additional EMTs needed by 64 programs})}$$

QUESTION 1.

What are the total expenditures for your program? From what sources did these funds come?

- a. IHS (638 & other contract)
- b. Tribal funds
- c. Other (3rd party, etc.)

QUESTION 2.

(This question was skipped if question 1 was answered.)

If total expenditures are unknown, what, approximately, is expended for the following: personnel, equipment, training, supplies, ambulances, insurance (malpractice, workmen's compensation, other)

IHS Area	IHS 638 Contribution	Tribal Contribution	Third Party	Year End Ambulance Funds	CHS (Fiscal Intermediary)
Aberdeen	\$2,501,677	\$245,356	\$607,000	\$315,000	\$1,141,313
Albuquerque	\$572,586	\$620,196	\$265,000	\$103,000	\$638,518
Bemidji	\$151,493	\$572,623	\$125,000	\$0	\$103,735
Billings	\$450,464	\$0	\$143,286	\$29,000	\$1,274,350
California	\$0	\$2,000,000	\$1,000,000	\$0	none
Nashville	\$900,000	\$611,000	\$0	\$0	\$41,076
Navajo	\$3,610,000	\$100,027	\$400,000	\$68,000	\$5,021,389
Oklahoma	\$0	\$2,500,000	\$0	\$0	\$600,293
Phoenix	\$2,108,000	\$1,811,272	\$2,933,871	\$253,000	\$1,949,677
Portland	\$943,347	\$379,285	\$175,250	\$78,000	\$219,147
Tucson	\$492,000	\$0	\$0	\$0	\$349,133
ALL AREAS	\$11,803,626	\$8,839,759	\$5,649,407	\$875,000	\$12,683,189

Table 6 - Financial Contributions by Source

Third Party is income collected for Emergency Medical Services that were provided and it is not necessarily the amount that is returned to the tribal EMS programs. A majority of programs surveyed indicated that their third party collections were placed in the tribe's general fund rather than returning them to the tribal EMS program. Some programs had no idea how much was billed for their services, nor how much was collected.

Year-end Ambulance Funds historically have varied from \$0 to \$1,000,000. Since 1999, the IHS Director has set aside \$500,000 each year for ambulance

replacements. This amount has been supplemented each year by up to \$500,000 in IHS residual funds and in contributions by some Area offices (notably Aberdeen and Navajo).

Amounts shown for IHS 638 Contribution were available for 40 out of 55 tribal EMS programs. Amounts shown for Tribal Contribution were available for 35 out of 55 tribal EMS programs. Amounts shown for Third Party were available for 33 out of 55 tribal EMS programs. Amounts shown for Year End Ambulance Funds and CHS (Fiscal Intermediary) were available by Area but not by program.

QUESTION 3.

How many EMTs do you currently employ? What is their status (full time/career, part-time/call or volunteer)? For volunteers, please report active members (those involved in patient care) only. For each level, EMT-Basics, EMT-Intermediate, EMT-Paramedic.

Total Full Time Tribal EMTs (55 programs)	679
Total Volunteer/Part Time Tribal EMTs (45 programs)	382
Percentage of Volunteer/Part Time EMTs of all Levels	36%
Full time EMT B (55 programs)	396
Volunteer/Part Time EMT B (48 programs)	270
Percentage of Volunteer/Part Time EMT B	41%
Full time EMT I (54 programs)	110
Volunteer/Part Time EMT I (48 programs)	56
Percentage of Volunteer/Part Time EMT I	34%
Full time EMT P (54 programs)	173
Volunteer/Part Time EMT P (48 programs)	56
Percentage of Volunteer/Part Time EMT P	24%

Table 7 - EMT Staffing

Although 36% of all EMTs are volunteer or part time, it is important to note that this percentage does not accurately represent the proportion of work performed by volunteer or part time employees. Actual work done (or services provided) by volunteer or part time EMTs (with the exception of all volunteer EMS programs) is probably a great deal less than the 36% of employees that they represent.

Numbers in parentheses are the number of programs for which data were available in each category.

QUESTION 4.

What is the average salary for EMT-Basic, EMT-Intermediate, EMT-Paramedic?

Certification Level	Tribal	JEMS	Federal
EMT-B, Non-FD	\$19,699	\$21,614	\$23,116
EMT-I, Non-FD	\$21,682	\$24,891	\$28,826
EMT-P, Non-FD	\$25,172	\$30,020	\$32,032
EMT-B, Fire Department	\$29,350	\$36,566	-----
EMT-I, Fire Department	\$29,280	\$35,860	-----
EMT-P, Fire Department	\$32,644	\$42,161	-----

Table 8 - EMT Salary Comparison

Current Salaries of tribal EMTs are significantly lower than for non-tribal EMTs in the United States. Lower salaries make recruitment and retention of skilled and experienced personnel more difficult.

The “Tribal” figures are calculated averages annual salaries reported by respondents. If programs reported hourly wages, an annual salary was calculated by multiplying that wage by 2080 (40 hours x 52 weeks).

The “JEMS” figures are from the Annual Salary Survey published in JEMS (Journal of Emergency Medical Services).²⁷

The “Federal” figures are Civil Service pay rates for the 5th step in the respective GS ratings, and explained in the Methodology Section on page 18. There are no readily available figures for Federal firefighters who are also EMTs.

All salaries listed are based on a 40-hour workweek, which is not typical for most EMTs. Thus, the salaries listed do not accurately characterize actual hours worked, payment received, or unpaid hours worked.

QUESTION 5.

Do ambulances have all patient care equipment needed to meet state standards?

Equipment	Quantity	Price	Total
Radios portable	13	1,000	\$13,000
Radios Assorted	7	4,286	\$30,000
Broselow Bags TM	4	500	\$2,000
Defibrillators	2	3,000	\$6,000
Cardiac Monitors	8	8,000	\$64,000
Med Pump	5	1,000	\$5,000
Extrication Equipment	2	5,000	\$10,000
Ventilator	1	3,000	\$3,000
Sager Splint	3	100	\$300
Pulse Oximeter	16	650	\$10,400
Backboard	4	100	\$400
Gurney	1	1,000	\$1,000
Oxylator-Ventilator	2	795	\$1,590
Total	-----	-----	\$127,490

Table 9 - Equipment Needs

All respondents answered "Yes" to this question; however, when asked if there was other equipment they believed was needed to improve patient care or to meet needs of particular patients (such as children), the respondents listed additional equipment which is consolidated above.

The figures above were obtained by asking tribal EMS program directors to identify any equipment that they needed **immediately**. Multiple vendors provided prices. The lowest prices were used in the calculations. The authors believe that this figure (\$127,490) is misleadingly low. For example, subsequent to data collection for this report, one program identified a need for \$25,000 worth of pediatric emergency equipment. More funds also are needed to replace damaged, lost, or obsolete equipment, to upgrade capabilities from BLS to ALS, as trained personnel become available, and to accommodate program expansions.

The original concept for determining cost of **additional needed patient care equipment** was to first establish a list of standard equipment needed for BLS & ALS ambulances derived from the ACS-COT²⁸, ACEP²⁹, & KKK-A-1822D³⁰ standards. Early in the survey, this concept was discarded. Instead, EMS program directors were asked if the ambulances in their particular program had

sufficient kinds and quantities of patient care equipment aboard to meet the standards of the state(s) in which the program operates. If the program director stated that additional equipment was needed, either to meet state standards or to provide for special needs such as EMSC, a list was made of that additional equipment.

QUESTION 6.

How many staff did you put through initial training, not continuing education, in the past year?

Certification Level	Number
EMT-Basic	211
EMT-Intermediate	19
EMT-Advanced Life Support*	52
Total	282

Table 10 - Number of EMTs Provided Initial Training in 1999

*The count of EMT-Advanced Life Support personnel trained may include some EMT Intermediates due to varying scope of practice and certification procedures in the different states.

QUESTION 7

How many ambulances are staffed and in service?

IHS Area	Total Ambulances
Aberdeen	26
Albuquerque	12
Bemidji	12
Billings	13
California	8
Nashville	10
Navajo	26
Oklahoma	6
Phoenix	22
Portland	21
Tucson	2
Total All Areas	158

Table 11 - Ambulances Per IHS Area

QUESTION 8.

How is your malpractice insurance covered? (check one)

How Insured	Number of Programs
Buy malpractice insurance	19
Self-insured or purchased by tribe	11
Federal Tort Claims Act	18
Unknown	7
Total	55

Table 12 - Methods of Providing Malpractice Insurance

QUESTION 9

Are you doing Third Party Billing?

Third Party Billing	
Yes	23
No	10
Unknown	22
Total	55

Table 13 - Third Party Billing for Services

QUESTION 10.

Does your program get to keep revenue generated by Third Party Billing?

Question 10 was not adequately answered. Many programs said that their third party revenue was collected by the tribe's financial department, not by the EMS program, and that the EMS program did not have information on the amounts collected or participate in decisions affecting the disbursement of the funds generated by collections from third parties. Other programs said they collected nothing and still others said they did not know .

QUESTION 11.

How many ambulance runs did your program make last year?

AREA	Number of Runs
Aberdeen	18,497
Albuquerque	6,230
Bemidji	4,085
Billings	5,780
California	2,134
Nashville	3,841
Navajo	16,017
Oklahoma	5,489
Phoenix	19,426
Portland	3,345
Tucson	2,000
Total Yearly Runs (1999)	86,844

Table 14 - Yearly Ambulance Runs

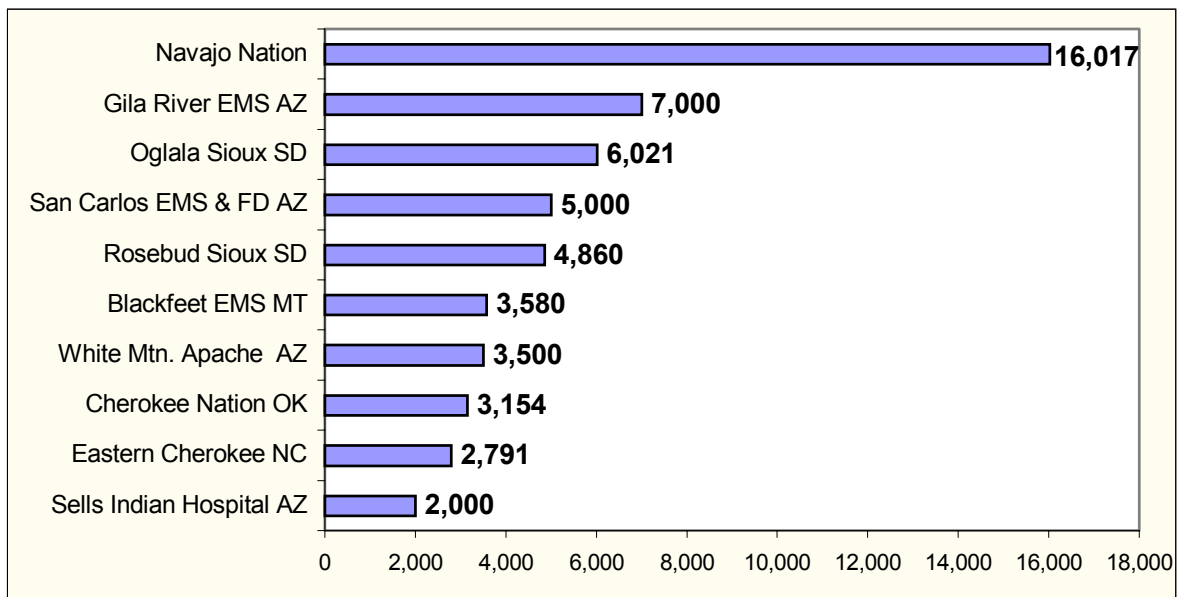


Figure 3 - Top Ten Programs by Run Volume

QUESTION 12.

The official IHS Service Population for your service unit is: _____. Is this the number of people your programs serves? _____. If not, what is the correct number and how many of them are Native American and how many are non-Native?

Reported Populations and FY 1998 User Population	
Service Population, Native American (47 programs)	632,921
Service Population, non-Native American (26 programs)	119,158*
Total Service Population	752,079
IHS User Population (51 programs)	642,388

Table 15 - Comparison to Service Population with User Population

*This total includes 50,000 non-Native residents of the Sycuan California Tribal Fire and EMS department's official service area. There are only 95 members of the Tribe in the same service area!

We collected data from EMS directors on their estimated service populations, Native and non-Native, and compared them to the official IHS User Population document for fiscal year 1998. Overall, the EMS program directors' estimates of their Native service populations were within 1.5 percent of the official IHS User Population figures. Because the User Population figures are published annually and are the basis of other IHS patient care statistics, we chose to use them.

Numbers in parentheses are the number of programs for which data were available in each category.

PART II - FINDINGS BASED ON ANALYSIS OF SURVEY DATA

PERSONNEL - EMT RATIOS

In Part II, 41 (74.5%) of the original 55 respondents provided complete data on EMT staffing, and 10 (18%) provided data with one or more "unknown" entries in the Number of EMTs fields. Data for an additional four (7%) could not be included in the calculations because there were no User Population figures available for the programs' associated IHS Service Units.

In addition to the 55 programs that responded, there were also nine programs for which no contact could be established. Thus, because complete data were available from only 41 out of 64 programs, there is an estimated 36% ($10+4+9=23$; $23/64=36\%$) underreporting of actual need.

Using the methodology described in detail on pages 15-18, state and tribal EMT ratios were calculated and compared in Tables 16-21, respectively. Based on the comparison obtained, the numbers of EMTs needed for each tribal program to reach parity with its respective state ratio was calculated, as well as the associated cost. While individual tribal staffing ratios are listed in Table 18 and 19, aggregate numbers of EMTs needed and costs are shown by Area in Tables 22 and 23 and in Figure 5 on pages 37 and 38 respectively.

State	State Population	State EMT B	State Ratio EMT B	State EMT I	State Ratio EMT I	State EMT P	State Ratio EMT P
Arizona	4,553,249	8390	18.43	166	0.36	2602	5.71
California	32,182,118	50000	15.54	200	0.06	10000	3.11
Colorado	3,892,029	16700	42.91	912	2.34	2269	5.83
Kansas	2,601,437	6113	23.50	962	3.70	694	2.67
Maine	1,241,895	2731	21.99	693	5.58	655	5.27
Minnesota	4,687,408	9741	20.78	358	0.76	1657	3.54
Montana	878,730	3302	37.58	281	3.20	204	2.32
Nebraska	1,657,009	7243	43.71	227	1.37	533	3.22
Nevada	1,678,691	3607	21.49	1654	9.85	657	3.91
New Mexico	1,723,965	3,018	17.51	1,010	5.86	788	4.57
New York	18,146,200	36725	20.24	2017	1.11	2843	1.57
N. Carolina	7,430,675	19125	25.74	1685	2.27	3497	4.71
N. Dakota	640,965	1818	28.36	363	5.66	330	5.15
Oklahoma	3,321,611	6575	19.79	1270	3.82	1449	4.36
Oregon	3,243,272	3994	12.31	1156	3.56	2162	6.67
S. Dakota	737,755	3115	42.22	230	3.12	210	2.85
Texas	19,385,699	21486	11.08	3621	1.87	10514	5.42
Utah	2,129,836	5,999	28.17	1267	5.95	681	3.20
Washington	5,614,151	11854	21.11	680	1.21	1360	2.42
Wisconsin	5,201,226	13000	24.99	1800	3.46	1700	3.27
Wyoming	480,043	1666	34.70	602	12.54	63	1.31
Totals	121,427,964	236,202	-	21,154	-	44,868	-
Mean	-	11.248	19.45	1,007	1.74	2,137	3.70
Standard Deviation	-	12.277	9.72	832	3.10	2,864	1.47

Table 16 - State EMT Counts & Ratios Per 10,000

Note that the standard deviation exceeds the mean calculation, indicating a broad range of ratio values, with the highest and lowest ratios summarized in Table 20 below.

Note that states with the larger populations often have EMT ratios near or below the mean.

The ratios of Basic, Intermediate, and Paramedic EMTs per 10,000 population in each state listed above are shown graphically in Figures 14, 15, and 16 in Appendix C.

Level	Highest (State)	Mean	Lowest (State)
EMT-B per 10,000	42.91 (Colorado)	19.45	11.08 (Texas)
EMT-I per 10,000	12.54 (Wyoming)	1.74	0.06 (California*)
EMT-P per 10,000	5.63 (Colorado)	3.70	1.31 (Wyoming)

Table 15 - Ranges and Means of State EMT Ratios

*Note: In California an EMT-2 is equivalent to an EMT-I. This ratio is extremely low because this level is being phased out. Arizona has the next lowest EMT-I ratio at 0.36.

Indian Health Service Area	Tribal EMS Service Name	FY 1998 IHS User Population	Tribal Ratio EMT B	Tribal Ratio EMT I	Tribal Ratio EMT P
Aberdeen	Belcourt Ambulance ND	13,156	6.08	4.56	1.52
Aberdeen	Crow Creek Ambulance & Rescue SD	3,684	24.43	2.71	0.00
Aberdeen	Lower Brule Sioux SD	2,020	34.65	4.95	4.95
Aberdeen	Omaha Tribal Rescue NE	3,607	24.95	0.00	0.00
Aberdeen	Pine Ridge Sioux SD	22,577	10.19	0.44	2.66
Aberdeen	Spirit Lake EMS, Fort Totten ND	4,973	4.02	4.02	8.04
Aberdeen	Standing Rock Sioux ND	9,431	8.48	3.18	8.48
Aberdeen	Teton Ambulance Service, Eagle Butte SD	8,057	19.86	2.48	2.48
Aberdeen	Winnebago Tribe of NE	4,005	37.45	0.00	0.00
Aberdeen	Area Subtotals	71,510	13.56	2.24	3.22
Albuquerque	Ignacio Volunteer Emergency Squad CO	1,031	67.90	38.80	0.00
Albuquerque	Jemez Pueblo NM	2,743	25.52	7.29	0.00
Albuquerque	Jicarilla Apache Tribe NM	3,697	18.93	10.82	0.00
Albuquerque	Zuni Pueblo FD NM	7,800	16.67	6.41	0.00
Albuquerque	Area Subtotals	15,271	22.26	9.82	0.00
Bemidji	Bois Forte Ambulance Service MN	1,115	116.59	0.00	0.00
Bemidji	Leech Lake Ambulance Service MN	8,728	18.33	0.00	0.00
Bemidji	Red Lake Ambulance Service MN	6,848	43.81	0.00	0.00
Bemidji	White Earth MN	7,332	23.19	0.00	0.00
Bemidji	Subtotals	24,023	31.64	0.00	0.00
Billings	Blackfeet Browning MT	12,043	4.98	0.00	0.83
Billings	Fort Belknap Volunteer Amb. MT	5,572	23.33	1.79	0.00
Billings	Rocky Boy Health Board MT	4,998	12.00	0.00	0.00
Billings	Subtotals	22,613	11.06	0.44	0.44
California	Ki:Maw Ambulance, Hoopa CA	2,780	32.37	0.00	46.76
California	Sycuan FD CA	95	4210.53	0.00	1052.63
California	Subtotals	2,875	170.43	0.00	80.00

Table 16 - Tribal EMS Program Ratios by Area

Compared with calculated state ratios, the majority of calculated tribal ratios is lower and indicates that these tribal EMS programs have inadequate personnel to meet the needs of their respective User Populations.

The figure 546,015 represents the total User Population of the 41 programs listed in this Table; the figure of 642,388 reported in Table 15 represents total User Population of 51 of the 55 responding programs. (Specific User Populations of the other four programs could not be accurately separated from the total Service Unit User Population.)

IHS Area	Tribal EMS Service Name	FY 1998 IHS User Population	Tribal Ratio EMT B	Tribal Ratio EMT I	Tribal Ratio EMT P
Nashville	Alabama-Coushatta Tribe of TX	820	60.98	24.39	0.00
Nashville	Cattaraugus Indian Reservation VFD	4,722	31.77	2.12	0.00
Nashville	Eastern Band of Cherokee EMS NC	11,029	10.88	3.63	19.95
Nashville	Passamaquoddy Indian Township	876	22.83	22.83	0.00
Nashville	Passamaquoddy Pleasant Point ME	1,130	35.40	0.00	123.89
Nashville	Subtotals	18,577	20.46	4.84	19.38
Navajo	Navajo Nation	253,382	3.35	1.18	0.28
Navajo	Subtotals	253,382	3.35	1.18	0.28
Oklahoma	Cherokee Nation EMS OK	55,237	1.27	1.99	4.34
Oklahoma	Prairie Band Potawatomi FD KS	2,368	59.12	16.89	25.34
Oklahoma	Subtotals	57,605	3.65	2.60	5.21
Phoenix FD	Ak-Chin FD AZ	558	483.87	35.84	340.50
Phoenix	Duck Valley EMS, Owyhee NV	4,279	9.35	14.02	0.00
Phoenix	Hualapai, AZ	1,908	47.17	0.00	68.13
Phoenix	McDermitt NV	620	161.29	48.39	0.00
Phoenix FD	San Carlos Apache AZ	11,774	12.74	0.85	5.95
Phoenix	White Mountain Apache AZ	14,945	9.37	0.67	5.35
Phoenix	Subtotals	34,084	23.18	3.81	13.79
Portland	Confederated Tribes of Colville	7,321	46.44	2.73	0.00
Portland	Makah, Neah Bay WA	3,544	19.75	2.82	0.00
Portland FD	Warm Springs Fire and Safety	4,788	4.18	25.06	14.62
Portland	White Swan Ambulance WA	11,654	3.43	24.88	4.29
Portland	Subtotals	27,307	17.21	16.11	4.39
Tucson	Sells Indian Hospital AZ	18,768	3.20	0.53	2.13
Tucson	Subtotals	18,768	3.20	0.53	2.13
IHS Totals and Averages		546,015	10.20	2.64	3.35

Table 17 -Tribal EMS Program Ratios by Area (continued)

Compared with calculated state ratios, the majority of calculated tribal ratios is lower and indicates that these tribal EMS programs have inadequate personnel to meet the needs of their respective User Populations.

The figure 546,015 represents the total User Population of the 41 programs listed in this Table; the figure of 642,388 reported in Table 15 represents total User Population of 51 of the 55 responding programs. (Specific User Populations of the other four programs could not be accurately separated from the total Service Unit User Population.)

Level	Highest (Area)*	Mean	Lowest (Area)
EMT-B per 10,000	31.64 (Bemidji)	10.2	3.20 (Tucson)
EMT-I per 10,000	9.82 (Albuquerque)	2.64	0.00 (Bemidji)
EMT-P per 10,000	19.38 (Nashville)	3.35	0.00 (Bemidji)

Table 18 - Mean Ratios of EMTs per 10,000 Population by IHS Area

*Excludes California Area. See discussion of Sycuan Fire and EMS in Part III of Results.

Certification Level	Tribal	States
EMT-Basic/10,000	10.20	19.45
EMT-Intermediate/10,000	2.64	1.74
EMT-Paramedic/10,000	3.35	3.70

Table 19 - Mean Ratios of EMTs per 10,000 Population

In aggregate (mean values), total EMT ratios (Basic, Intermediate, and Paramedic) in tribal programs are significantly less than the total EMT ratios in their corresponding Reservation states.

In both states and tribal programs there are many more EMT Basics providing care than there are advanced life support personnel (EMT Intermediates and Paramedics) providing care.

IHS Area	EMT Basics	EMT Intermediates	EMT Paramedics	Totals
Aberdeen	168	12	9	189
Albuquerque	1	0	7	8
Bemidji	2	2	8	12
Billings	60	6	4	70
California	0	0	0	0
Nashville	16	0	2	18
Navajo	370	59	123	552
Oklahoma	102	10	0	112
Phoenix	25	0	2	28
Portland	25	0	3	28
Tucson	29	0	7	36
Totals	799	90	166	1055

Table 20 - EMTs Needed for Ratio Parity by Area

IHS Area	EMT Basic	EMT Intermediate	EMT Paramedic	Total for All EMT Levels
Aberdeen	\$4,850,650	\$444,995	\$359,975	\$5,655,619
Albuquerque	\$18,920	\$0	\$284,683	\$303,603
Bemidji	\$61,773	\$66,111	\$340,025	\$467,909
Billings	\$1,732,913	\$224,525	\$170,157	\$2,127,595
California	\$0	\$644	\$0	\$644
Nashville	\$473,483	\$22,721	\$65,928	\$562,132
Navajo	\$10,697,888	\$2,133,954	\$4,937,233	\$17,769,074
Oklahoma	\$2,957,100	\$364,633	\$3,854	\$3,325,587
Phoenix	\$734,736	\$2,506	\$98,411	\$833,147
Portland	\$721,974	\$0	\$105,385	\$827,359
Tucson	\$825,896	\$0	\$269,276	\$1,095,172
TOTALS	\$23,075,333	\$3,257,582	\$6,634,927	\$32,967,842

Table 21 - Costs to Achieve EMT Ratio Parity by Area

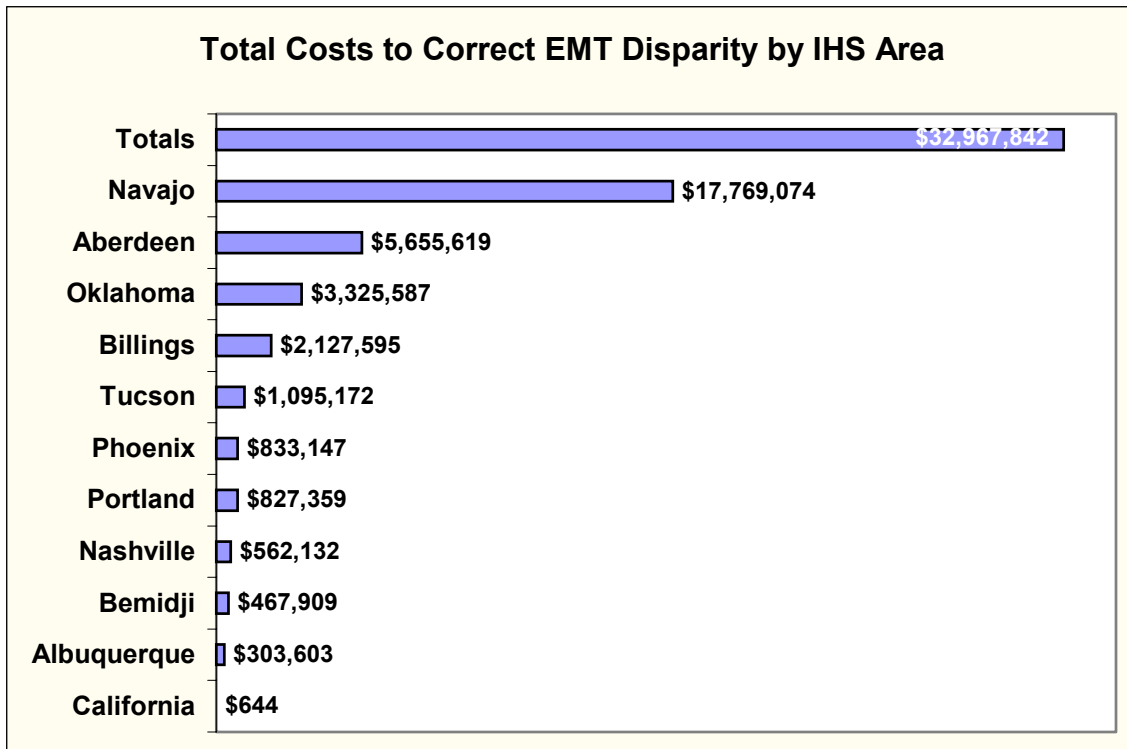


Figure 4 -Total Costs to Correct EMT Disparity by IHS Area

AMBULANCES

The initial approach to determine unmet need for ambulances was to establish the number of ambulances in service in 24 of the 25 Reservation states. After contacting State EMS offices, we found that they only kept information on ambulances that were licensed, not necessarily involved in EMS activity.

Total Tribal Ambulances	158
Total Programs with only one ambulance unit	15
Additional Programs with < one ambulance unit/500 runs	13
Number of Ambulances needed in the preceding categories	28
Total Cost of 28 Ambulances at \$75,000* per unit	\$2,100,000

Table 22 - Ambulance Costs

*\$75,000 is a budgetary estimate of the cost of a new ambulance. The actual prices paid by the US General Services Administration (GSA) for ambulances

under the "MARK" contract range from \$56,000 for a Type II (raised top van) ambulance to \$69,000 for a Type I (pickup cab and chassis) with four wheel drive. Indian tribes can use this contract if certain conditions are met. Prices vary with Type and Options selected. Prices on the open market are higher and also depend on the Type, features, and equipment selected.

Because there were no published standards, the authors chose to use the following argument to justify the need for backup ambulance units within individual tribal EMS programs. There are 15 tribal EMS programs with only one ambulance vehicle. Run volume for these programs varied between 47 to over 1000 per year. The authors believe that all of these programs need at least one more ambulance unit. A single ambulance along with its crew is unavailable to respond to additional calls during all responses, patient transports, routine inter-facility transfers, while returning from out of district and whenever it needs disinfecting, restocking, mechanical repairs or maintenance. In some states, a single ambulance unit is unavailable during any standby at local sporting events such as regularly scheduled high school football games and All Indian Rodeos. There is an unknown but significant cost associated with contracting for ambulance coverage from surrounding communities. This cost certainly impacts some of the tribal programs, but to an unknown extent.

In addition to the 15 programs with only one ambulance unit, there are 13 other tribal EMS programs that have a call volume of 500 calls per year per ambulance that have only two ambulance units. We consider most of these programs to be under equipped with ambulance units as well. As soon as the first unit is committed to any activity the EMS program is down to one unit. With 500 calls per year per ambulance, both units will frequently be in service simultaneously, especially during the busy evening and nighttime hours, weekends and holidays when it is most critical to have adequate coverage.

PART III - FURTHER DISCUSSION OF RESULTS

There are some unique programs and issues, which require separate commentary.

NAVAJO NATION EMS

Navajo Nation EMS staffs 12 ambulance stations, covering over 25,000 square miles in three adjacent states—Arizona, New Mexico and Utah. The Navajo Nation is comprised of an IHS User Population of 253,382 and an unknown number of non-Native residents.

In the Annual Funding Agreement of its “638 contract,” Navajo Nation EMS limits its scope of work to prehospital response only. In this study, the eight Navajo Service Units were consolidated into one system, with an impressive aggregate Area call volume of over 16,000 per year. Because Navajo Nation is roughly split between Arizona and New Mexico, the authors chose to average the state ratios of EMTs per 10,000 for Arizona and New Mexico (for all three levels of certification) and compute disparities in ratios from those three averages.

In spite of the size of the area covered and the population served, Navajo has extremely low EMT staffing levels.

- Navajo Nation EMS has a User Population of 253,382, which is 39% of the total User Population of the 51 programs for which User Population was available.
- Navajo Nation EMS completed 16,017 annual **prehospital** transports in 1998. This is 19% of total transports (**prehospital plus interfacility**) in the sample.
- Navajo has 85 EMT Basics. This is 13% of the total EMT Basics in the sample.
- Navajo has 30 EMT Intermediates. This is 18% of the total EMT Intermediates in the sample.
- Navajo has 7 EMT Paramedics. This is 3% of the total EMT Paramedics in the sample.

The numbers of EMTs needed for Navajo Nation to reach state ratio parity assumes that Navajo EMS would perform interfacility transports in addition to prehospital response and transport.

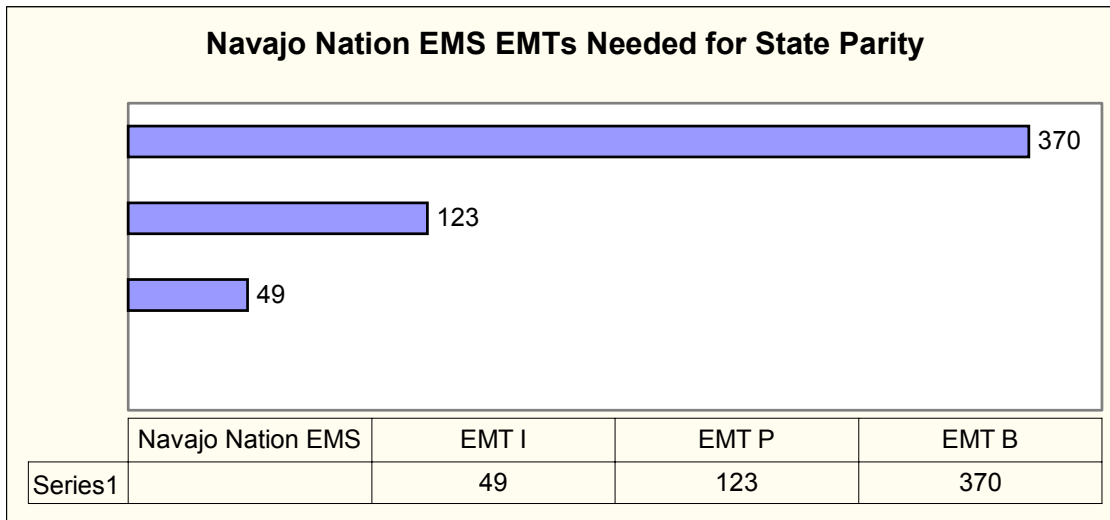


Figure 5 - Navajo Nation EMS EMTs Needed for State Parity

LIMITED NUMBERS OF ADVANCED EMTS

Of the tribal EMS programs that provide limited or full advanced life support, 24% have less than 3 EMT Intermediates or Paramedics on their staff. This represents 43,345 User Population. Seven of the 41 programs (17%) have no advanced EMTs and provide strictly basic life support. This represents 38,541 User Population. These figures include full time and part time/volunteer EMTs from 41 programs reporting complete data. The combined total of 81,886 represents 15% of the 546,015 User Population in the sample.

The authors do not know, but hope that additional advanced backup services are provided by some other non-tribal EMS program in the vicinity.

Interviews with many EMS program directors indicated that their EMTs often are working excessive shifts and very long hours, sometimes without compensation, and there are frequent instances when Advanced Life Support (ALS) care is not available due to the shortage of these personnel.

Long, often brutal hours, frequent emergency call back, lack of sleep and minimal time off duty can quickly become hazardous to EMTs and their patients as stress and sleep deprivation begin to affect their judgment. Driving under these conditions is extremely hazardous. Attending critical patients under these circumstances can result in life threatening judgment errors. Including high trauma death rates, low pay, tragedies involving close acquaintances and few opportunities for career advancement, valuable EMS personnel are at high risk for Critical Incident Stress and burnout. The loss of an experienced local EMT is a loss to the entire community.

SYCUAN FIRE AND EMS, CALIFORNIA

The Sycuan service unit is unique. Located in San Diego County, California, Sycuan has an IHS User Population of 95 Native Americans. Unlike most tribal EMS programs the Sycuan Fire Department provides fire and EMS to the Sycuan casino. Sycuan FD contracts with the nearby Native American community of Viejas (population unknown) and also provides fire and EMS to a large unincorporated area of northeastern San Diego County. This checkerboard area of coverage includes State and National Parks, many communities, and varying local levels of service (some fire only, some medic/rescue non-transport, and some that transport patients). The total population served was estimated by the program director as 50,000 people. The use of IHS User Population alone creates distorted results, but for consistency User Population was used, as in calculations for all the other tribal EMS programs.

TRIBAL CASINOS

During the study the authors were made aware of the fact that many tribes operate casinos on their reservations. With very few exceptions, casino EMS is a totally separate operation from tribal EMS programs. Because of this separation, casino patronage does not affect tribal EMS except by increasing the traffic flow to and from the casino through the EMS response district. The ingress and egress to tribal casinos is often over unimproved roadways, and some increase in motor vehicle related calls can be expected. It is reasonable to expect also that in cases of disaster or mass casualty, the casino ambulance units could be responded to assist.

EFFECTS OF INCOMPLETE DATA

The authors attempted to retrieve complete data from all 64 transporting EMS programs. Of these transporting EMS programs, we obtained complete EMT staffing data from 41 (64%) and incomplete EMT staffing data from 10 others (16%). Data for an additional four (6%) could not be included in the calculations because there were no User Population figures available for the programs' Service Units. There were also nine programs (14%) with which no contact could be established.

Because complete data were available from only 41 out of 64 programs, there is an estimated 36% ($10+4+9=23$; $23/64=36\%$) underreporting of actual need. To calculate unmet need for all 64 transporting tribal EMS programs, data from the 41 programs that provided complete staffing data (64% of 64) was scaled to include the need for all 64 programs, using the ratio 64/41.

No data were collected for those 13 tribal EMS programs that do not transport. In retrospect, it would have been better to include the non-transporting EMS programs as well.

TOURISTS

Tribal EMS often covers huge tracts of heavily traveled tourist areas. Millions of transient populations pass through tribal lands every year. Particularly in the cases of Eastern Band of Cherokees and Blackfeet tribes, that are both located at gateways to national parks, during holidays and summer months the population can swell by huge amounts almost overnight.

The impact of these tourist populations on the EMS system can be enormous. Large vehicles loaded down with people driving unimproved and unfamiliar roads not designed to handle high volume traffic loads, and stopping to visit the local casino or shopping areas can cause major fluctuations in the need for EMTs and ambulance units on duty. Transient populations were not taken into account in the calculations for EMTs needed for state parity.

ALL-VOLUNTEER TRIBAL EMS PROGRAMS

There are eight (19.5%) all volunteer Tribal EMS out of the 41 programs that provided complete data. These programs serve 28,415 Native Americans and an unknown number of non-Natives. Of these programs, two are BLS only and three others have only one EMT I. There are no paramedic level volunteer programs.

Total All-Volunteer Tribal EMS Program	8
Percentage of All-Volunteer EMS Programs	8/41 (19.5%)

Table 23 - All Volunteer Tribal EMS Programs

ADJUSTMENTS TO EMT BASIC TOTALS AS A RESULT OF “EXCESS” EMT INTERMEDIATES AND PARAMEDICS

There are eight programs out of 41 that have one or more “excess” advanced care providers, and a deficit in providers of lesser certification or licensure. In these programs, Paramedics make up for any shortage of EMT Intermediates and Basics on a man for man basis. EMT Intermediates can make up for a shortage of EMT Basics. Lesser level EMTs cannot replace more advanced care providers.

It should be emphasized, however, that an excess of paramedics in one program does not make up any shortage in a different program. The paramedic staffing of a tribal fire department may be much higher than the state ratio, but this fact does not help a neighboring district whose ratio may be much lower. For this reason, advanced EMTs in excess of state ratios were ignored in the final results except when they were in the same programs and could replace one of their own staff.

Overall:

- 45 EMT Basics are compensated for by EMT Intermediates or EMT Paramedics. This amounts to a potential reduction of \$1,300,620 per year in unmet need.
- Four EMT Intermediates are compensated for by EMT Paramedics with a potential reduction of \$143,337 per year in unmet need.

AMBULANCE RUNS PER 10,000 USER POPULATION

Analysis of all programs that provided User Population figures and yearly ambulance run data yielded a mean ratio of 1310.3 ambulance runs per 10,000 User Population per year. Data were not gathered to determine the percentage of interfacility transfers or emergencies.

Ambulance Runs per 10,000	
Lowest	106.5
Mean	1,310.3
Highest	4,004.6

Table 24 -Yearly Ambulance Runs per 10,000 Service Populations

SURVEY LIMITATIONS

As noted in the Methodology section, multiple avenues were explored to determine if current standards (federal, state, or professional) exist for rural EMS staffing. The absence of such standards required the creation of a reference for comparison. The authors decided to compare the numbers of EMTs (Basic, Intermediate, and Paramedic) working for tribal EMS programs with the numbers of EMTs with active licenses/certifications in the same states; these ratios were adjusted to the common population denominator of 10,000. The authors acknowledge that this reference standard was created for the purpose of comparison, and does not address the actual distribution of EMTs within a given state, or the relative adequacy of EMS staffing within those states. More accurate comparison could be achieved in several ways, but they are beyond the scope of this study. Alternative approaches could include comparing tribal EMT staffing with non-tribal EMS services within their same county, or more exactly, within counties matched for both size and population density.

Determining what service population to use for each EMS program was a matter of considerable concern, uncertainty and debate among the authors. Among the choices were the service population figure given by the EMS Service Director, which includes the non-Native Americans served. This self-reported number seemed to make empiric sense, but in itself was not verifiable. Another possible population figure would be the IHS Service Unit US Census population (which includes Native and non-Native Americans), but this figure is not readily available for all service units. The third alternative considered was IHS Service Unit Resident and User Populations. It should be noted that IHS Service Unit Population figures did not differ much from the service populations reported by the service directors, including the fact that User Population figures do not include non-Natives. When one compares the US Census Native American Service Unit population with the IHS Service Unit User Population, the former is quite a bit lower than the latter. For example, in Navajo Area, the Chinle Service Unit Census population for CY 1998 was 28,731, while the User Population for FY 1998 was 37,918. Obviously, ratio calculations of staffing and projected need will differ depending on which population figure is chosen for the denominator. Ultimately, the User Populations were used because these figures are readily available (currently and historical) and verifiable.

The IHS identifies thirty-five "Reservation States," and yet all seventy-seven tribal EMS programs are located in only twenty-four of these states (excluding Alaska). The authors obtained EMT data from the EMS Bureaus of Utah, Wisconsin and Wyoming, but did not receive survey data from the four corresponding tribal EMS programs in these states. (There is/are one tribal EMS program in Utah, two in Wisconsin, and one in Wyoming.) While no direct comparison can be made between tribal staffing ratios with state EMT ratios in these states, it was decided to include the data from these EMS Bureaus in the aggregate (mean) state EMT ratios for EMT-Basic, Intermediate, and Paramedic.

The authors concluded that it was appropriate to include them in the aggregate state data because they are Reservation States, which represent 5% of all tribal EMS programs. We acknowledge that this decision will slightly affect the calculated state mean ratios, and that an equivalent argument can be made not to include these three states in the mean calculation.

Another limitation of this survey is that no data were collected regarding the actual amounts of back up or overtime hours that Tribal personnel are expected to work, with or without compensation. This information is important for two distinct reasons. First, an accurate accounting of these hours could be used to corroborate manpower needs calculated from the standard of comparison mentioned above. In addition, such extended work activity, particularly if it is not compensated, contributes to staff fatigue, burnout and turnover. These conditions, especially fatigue, can lead to poor judgment and unsafe actions in the care of patients (e.g., driving) particularly when no other EMTs are available to handle emergency calls for life-threatening problems. Likewise, no attempt was made to assess any of the significant issues of burnout, or recruitment and retention in this study.

While the survey tool was able to accurately assess the numbers of full-time, part-time and volunteer EMTs in each program, it was not designed to determine the exact percentage of the workload that each of these category of employee contributes. Thus the aggregate figure that 39% of Tribal EMTs are volunteers does not mean that 39% of the aggregate workload is carried by them; presumably it is significantly less. Most of the programs surveyed do not rely on an all-volunteer staff; however 10 of the programs surveyed (18%) are fully volunteer. The exact portion of round-the-clock coverage that is contributed by volunteers is unknown for the remaining 45 programs.

While the 13 non-transporting First Responder programs could have been contacted, and their responses included in this analysis, a decision was made not to include them for a variety of reasons. Among the reasons is the fact that some states license First Responders, but most do not. First responders usually are community volunteers, whose training may vary considerably. In retrospect, it would have been preferable to include all thirteen non-transporting tribal First Responder programs so as to define their level of operation and level of need. At present, the characteristics of these programs are unknown.

Extensive data was collected and analyzed from all IHS Areas except Alaska Area. Some information about Alaska Area was gathered prior to the initiation of the present assessment. Site visits to three communities in Alaska were made by members of a Technical Advisory Committee of the NNAEMSA in 1999. They reported on the unique nature of EMS in these representative communities, which depend heavily on community health practitioners (CHP) and the town Fire/EMS Department, and various means of transport other than ground ambulance. At the time of the site visits there were no ambulance programs

supported by the IHS/GSA Shared Cost Ambulance Program, and therefore none listed on the Tribal EMS/Ambulance Program Directory maintained by the Mountain Plains Health Consortium. In spite of these site visits and the lack of ambulance programs, the present study should have included a more focused effort at gathering information from Alaska Area tribal community EMS programs. The lack of information is significant, and regrettable.

CONCLUSIONS

Responses to this survey indicate that tribal EMS programs are understaffed and under-funded, and that there is a continued need for back-up and replacement ambulances as well as new and replacement patient care equipment. These findings are consistent with the previous EMSC Needs Assessment survey completed in 1998; it showed an expressed need for manpower, training and education, and equipment (including computer hardware and software).

The single greatest need is EMT staffing. By comparing state and tribal EMT ratios, the present study demonstrates that tribal EMS programs have inadequate personnel to meet the needs of their respective User Populations. As shown in Table 27 and Figures 6-8, in aggregate (mean values), overall EMT ratios in tribal programs are significantly less than EMT ratios in the corresponding states. The disparity is most pronounced at the EMT-B level.

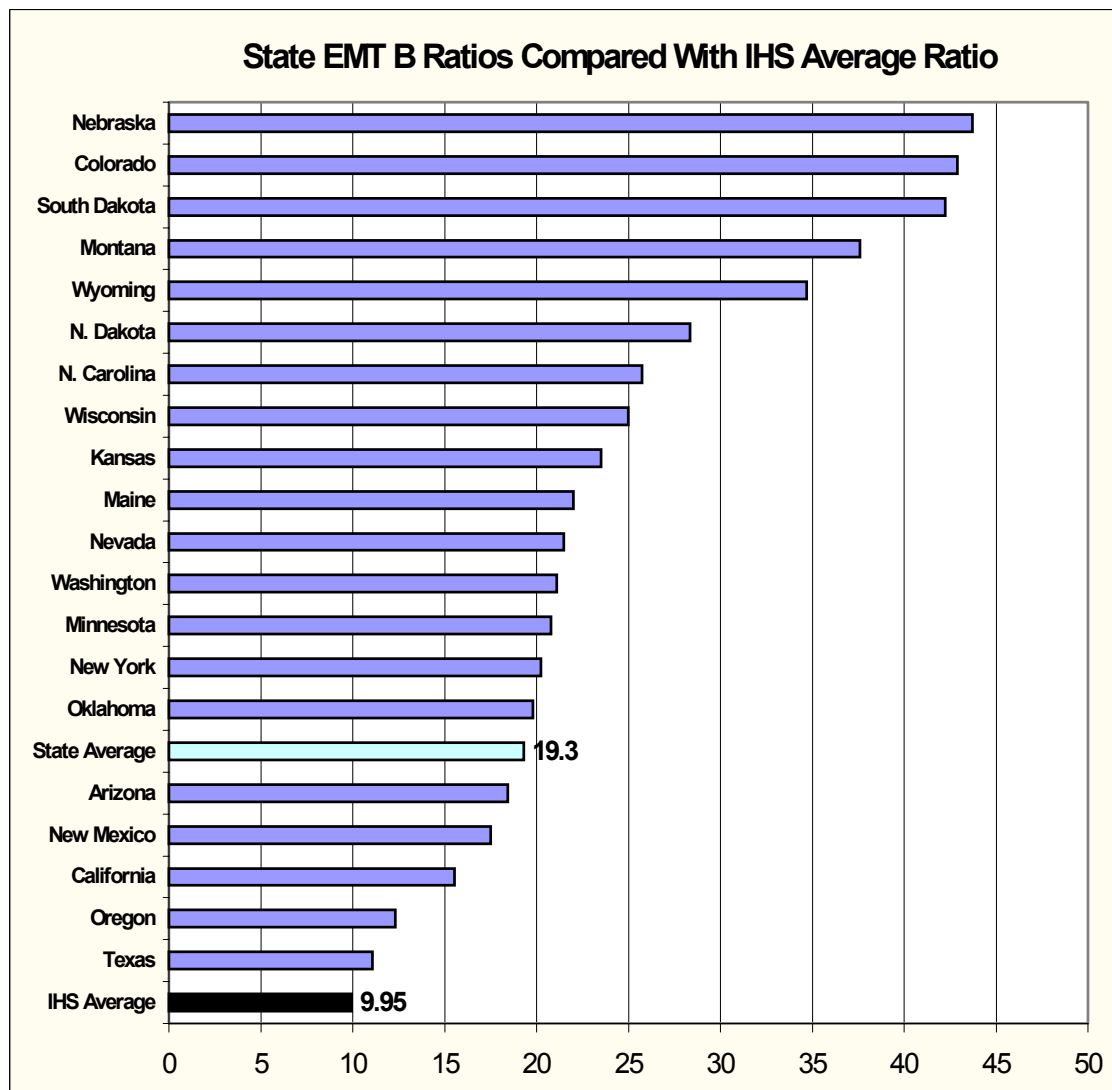


Figure 6 - State EMT Basic Per 10,000

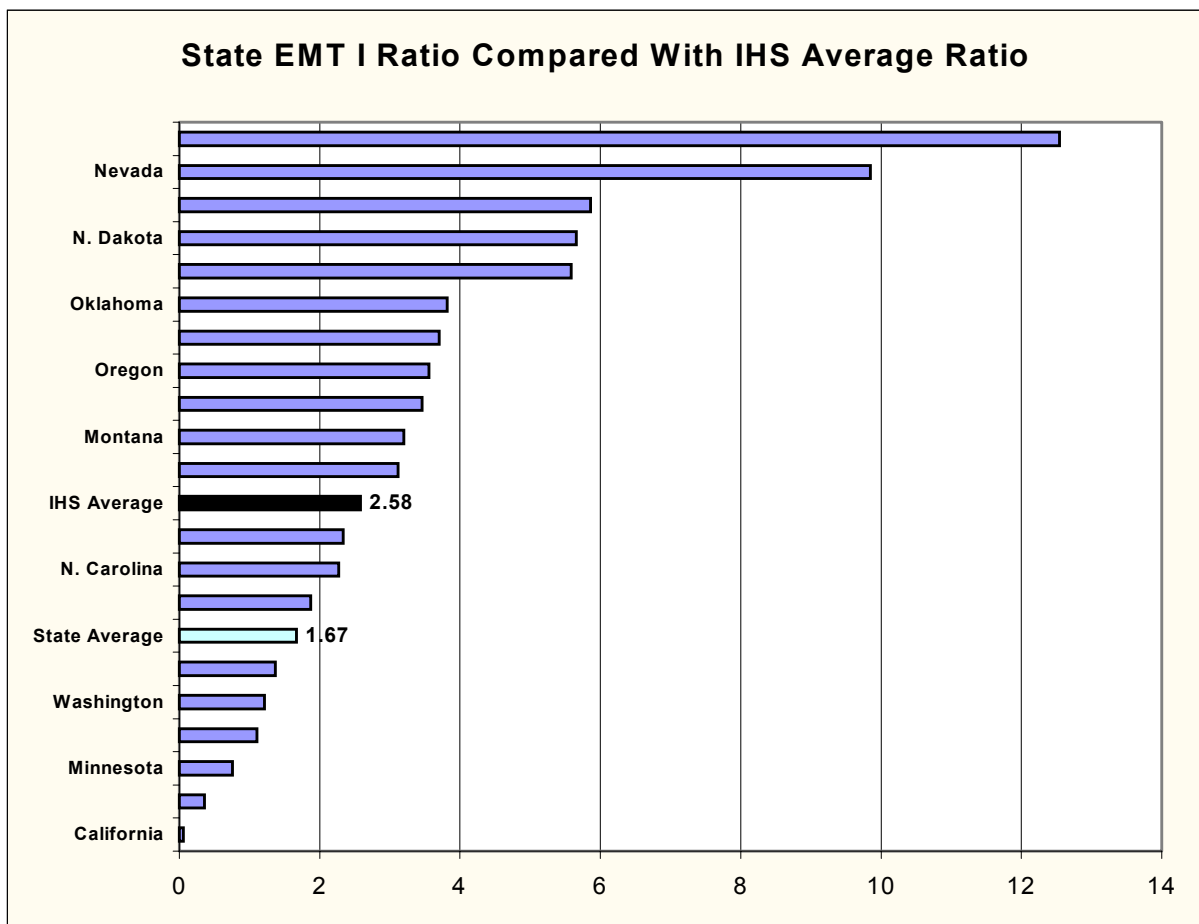


Figure 7 -State EMT Intermediate per 10,000

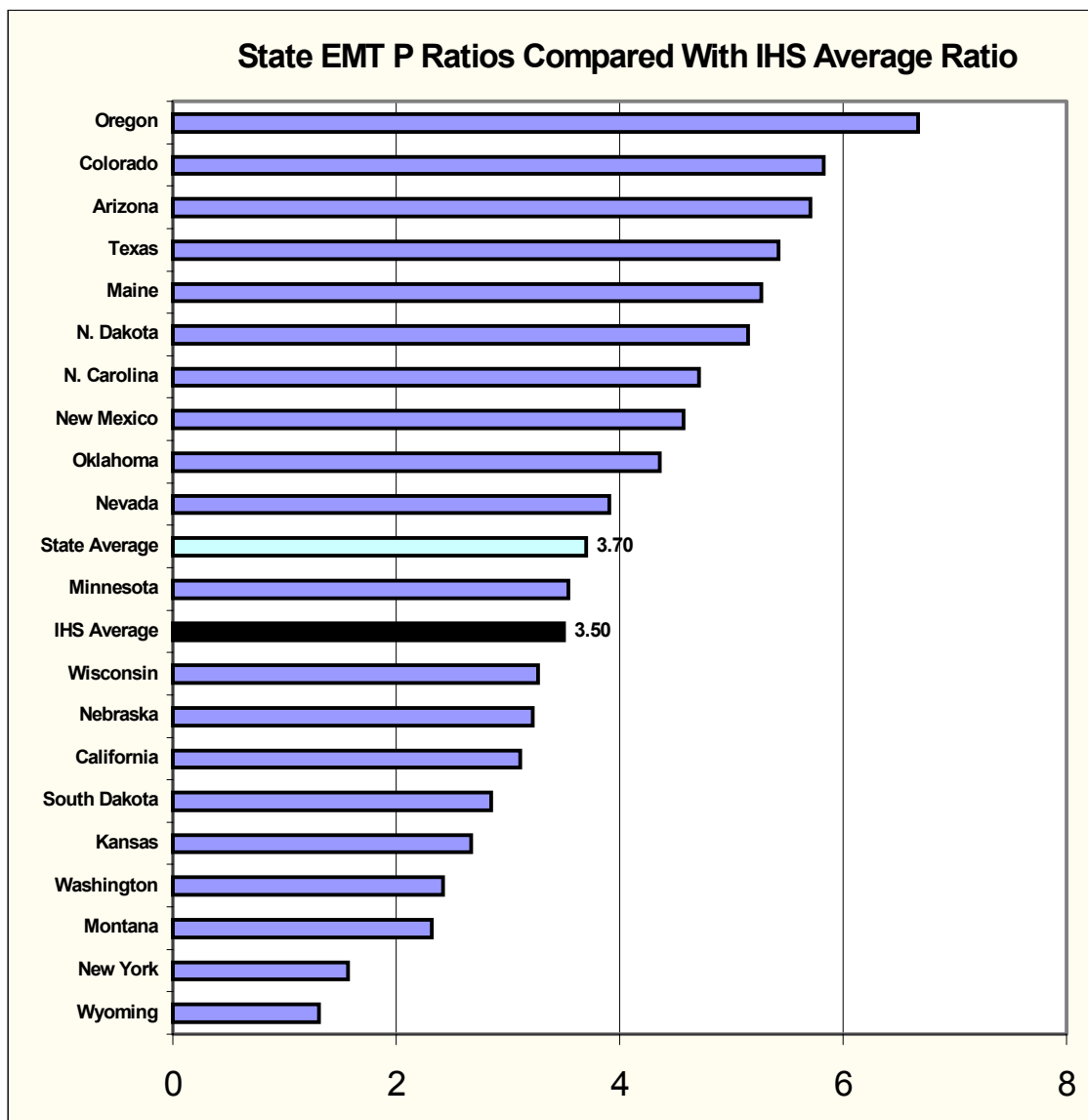


Figure 8 - State EMT Paramedic Per 10,000

Certification Level	Tribal	States
EMT-Basic/10,000	10.20	19.45
EMT-Intermediate/10,000	2.64	1.74
EMT-Paramedic/10,000	3.35	3.70

Table 25 - Ratios of EMTs per 10,000 Population

COST OF REACHING PARITY

For the 41 programs with complete data sets to reach parity with respective state EMT ratios, an additional **\$32,871,702** each fiscal year would be needed. This projected increase does not include the associated cost of primary and continuing education. Allowing comparable projections for the additional 23 programs for which data was not reported, or was incompletely reported, the projected need increases to a total of **\$51.5 million**. (This figure was obtained by applying the ratio described on Pages 22 and 43 to the \$32,871,702 figure above.)

It should also be noted that such an increase would only maintain the current relative distribution of BLS and ALS personnel within existing programs. It does not take into account any trend by tribal EMS programs to evolve toward ALS services. Such continued evolution would require additional funds due to the increased salaries associated with having more EMT-intermediate and EMT-paramedic personnel, increased costs of training and re-certification, and significant costs for more advanced equipment.

LEVEL OF NEED FUNDING

The present total expenditure for tribal EMS programs participating in this survey is \$33 million dollars. IHS contracts and compacts, tribal funds and year-end ambulance funds provide a total of \$21 million annually. In addition, CHS contributes at least another \$12 million (or one-third) toward the annual EMS expenditure for American Indians in eleven IHS Areas. Only twenty-three of fifty-five programs routinely bill for services; these programs collected \$5.6 million from third party billing.

Looked at in another way, the findings of this assessment of unmet tribal EMS needs are comparable to findings of the IHS Level of Need Funded Workgroup: the results support a claim of health disparity. Specifically, in terms of staffing alone, tribal EMS programs are presently funded at less than 50% of their level of need.

Future IHS appropriations should address these unmet needs, and some percentage of these increased appropriations should be set aside for establishing EMS infrastructure, gathering annual data, and performing ongoing program and systems assessments.

RECOMMENDATIONS

TO INDIAN HEALTH SERVICE

- Collection of annual EMS program data should occur at the Service Unit and Area Office levels; this data should be organized, reported and maintained at Headquarters, or by some designated organization. A two-page template of suggested minimal annual data elements has been included (Appendix B).
- Additions to or changes in IHS policy regarding EMS should be consistent with the recommendations of the EMS Agenda for the Future, and those of the Office of Rural Health Policy, which pertain to EMS.
- Provide a copy of this report to all tribal governments with EMS programs, all their EMS Medical Directors, all tribal EMS Program Directors, the National Native American EMS Association, Bureau of Indian Affairs, State EMS Bureaus, and any other health association with interest in tribal health and EMS.
- Promote improved relations between tribal EMS programs and their respective state EMS Bureaus, particularly in regard to collection of baseline service data and participation in trauma registry, Critical Incident Stress Debriefing (CISD) teams, and Childhood Fatality Review Committees.
- Promote the utilization of existing resources from the EMSC Program of the Maternal and Child Health Bureau to increase the capacity of tribal EMS programs to enhance injury prevention activities and to effectively meet the needs of critically ill and injured children.
- Explore the possibility of utilizing Partnership for Children (PFC) contracts of the EMSC Program to facilitate EMSC Program goals for tribal EMS programs.
- Utilize the EMS Resource Requirements Methodology (RRM) to analyze the existing staffing and resource allocation of tribal EMS programs, and determine if the driving variables and staffing criteria that are used in RRM accurately reflect current workload and program needs; revise the RRM as needed.
- Recommend that EMS run data be reported to, and analyzed by, Service Unit or tribal Injury Prevention Committees.
- Confirm that the EMS Medical Director is involved in regular performance improvement (PI) activities with his or her EMS program and that he or she reports these activities through the usual Hospital or Clinic PI process; at a minimum, this would consist of regular “run reviews.”
- Review the Priority Recommendations in the 1993 NHTSA TAT System Assessment report for applicability to the present Tribal/IHS EMS Systems and utilize the Priority Recommendations in determining future appropriation requests.
- Meet with the staff of the Alcohol and Substance Abuse Program of the BIA’s Office of the Assistant Secretary-Indian Affairs to examine the impact of generational grief on the function of tribal EMS programs. Establish an inter-agency work group to identify unique needs of tribal EMS personnel in

providing patient care, examine resources available to meet those needs, and make recommendations regarding additional resources needed.

- Assist each EMS program in completing a formal inventory of patient care equipment that needs to be replaced as well as newly purchased. Utilize the lists of BLS and ALS equipment required by state EMS Bureaus and professional organizations (e.g., the EMSC Program³¹) as standards.
- Collaborate with tribal EMS programs, tribal Casinos, and the National Indian Gaming Association (NIGA) to assess the impact of casinos and casino EMS on existing tribal EMS systems.
- IHS and Tribal Programs should explore the possibility of IHS submitting bills on behalf of tribal EMS programs without billing capability; revenue collected should be returned to the EMS program to directly support EMS activities.

TO TRIBAL EMS PROGRAMS

- Collect annual data regarding all aspects of service operation, and use it for documenting workload, requesting increased funding for unmet needs, and for long term planning; document historical trends regarding staffing, funding, and workload as well.
- All programs should be billing third parties for reimbursement.
- IHS and Tribal Programs should explore the possibility of IHS submitting bills on behalf of tribal EMS programs without billing capability; revenue collected should be returned to the EMS program to directly support EMS activities.
- Programs are encouraged to include an annual proposal for funding of unmet needs as part of the usual Annual Funding Agreement (AFA); this proposal should be prioritized, include short and long term goals and needs, and an itemized budget.
- Programs that are not “certified” by their state EMS Bureau are encouraged to initiate that process, in order to increase third party reimbursement and support and enhance program activities.
- Programs that do not fully participate in Service Unit Injury Prevention Committee activities are encouraged to do so.
- Request your state EMS Bureau to include your service as a participant in any planned NHTSA State Assessment or Reassessment, or EMSC Assessment.
- Complete a formal inventory of all equipment needs, including replacement equipment; determine whether equipment purchase and/or replacement is specified in your 638 contract. Utilize the lists of BLS and ALS equipment required by state EMS Bureaus and professional organizations (e.g., the EMSC Program³²) as standards.
- Tribes are encouraged to allow tribal EMS program directors access to all budgetary information affecting their EMS programs, including contract specifics and third party receipts for use in determining yearly budgets and in planning.
- Participate in a regularly scheduled Childhood Fatality Review Committee process.

FURTHER WORK THAT NEEDS TO BE ACCOMPLISHED

- To establish an ongoing data collection system by EMS programs and IHS Areas
- To track annual overtime and compensatory time, compensated and not compensated, in a sample of programs to corroborate projected manpower needs
- To establish an inter-agency task force on the impact of generational grief on the individual EMT and the tribal EMS system.
- To catalogue an accurate inventory of current and future equipment needs for each program, and establishing a recurring source of funding for procurement and replacement
- To complete a focused needs assessment of programs in the Alaska Area
- To link EMS run data with Injury Prevention Committee activities
- To integrate and institutionalize EMSC program goals, activities and resources into each EMS program
- To enhance communication and relationships between each EMS program and its respective state EMS Bureau
- To establish a method for linking local EMS run data with existing state trauma registry data
- To integrate EMS performance improvement (PI) activities with the local institutional (tribal or IHS) overall PI and risk management plans.
- To establish regular interval evaluation of IHS Manual of Clinical Service, Chapter 17, and the Resource Requirements Methodology (RRM) for EMS
- To establish a forum for tribal EMS career development which will include addressing recruitment and retention and continuing education issues

APPENDIX A -- 1993 NHTSA TECHNICAL ASSISTANCE TEAM RECOMMENDATIONS

COMPONENT	RECOMMENDATION NUMBER
A. REGULATION AND POLICY	(A-1 thru A-9)
B. RESOURCE MANAGEMENT	(B-1 thru B-7)
C. HUMAN RESOURCES AND TRAINING	(C-1 thru C-8)
D. TRANSPORTATION	(D-1 thru D-10)
E. FACILITIES	(E-1 thru E-5)
F. COMMUNICATION	(F-1)
G. PUBLIC INFORMATION AND EDUCATION	(G-1 thru G-8)
H. MEDICAL DIRECTION	(H-1 thru H-5)
I. TRAUMA SYSTEMS	(I-1 thru I-7)
J. EVALUATION	(J-1 thru J-7)

The following is the listing of the sixty-seven (67) recommendations identified by the NHTSA Technical Assistance Team (TAT) in the assessment of EMS in IHS. Please note the **BOLD PRINT** represents the twenty-six (26) priority recommendations made by the TAT.

LISTING OF ALL SIXTY-SEVEN (67) RECOMMENDATIONS

A. REGULATION AND POLICY (A-1 thru A-9)

- A-1 ♦ **Establish an adequately staffed EMS Branch within IHS to assure Effective oversight, policy development, support and advocacy for Quality EMS for Native Americans.**
- A-2 ♦ **Establish an EMS line item within the IHS budget with a dedicated EMS funding base consistent with clearly documented EMS needs by Fiscal Year 1995.**
- A-3 ♦ IHS and Tribal Governments should continue pursuit of other possible sources of funding to help meet identified needs. Such sources may include collection from third party payors or application for NHTSA 402 funds or Federal Highway Administration funds for special projects.
- A-4 ♦ **Congress and IHS should officially recognize EMS as an integral part of health care for Native Americans.**
- A-5 ♦ **The IHS Branch should revise Part 3, chapter 17 of the Indian**

Health Manual to reflect current EMS standards by the end of Fiscal Year 94 and provide thereafter for annual review with revisions as necessary.

- A-6 ♦ **The IHS EMS Branch should work aggressively to attain integration of Native American EMS Services with state EMS systems, including compliance with state standards.**
- A-7 ♦ The IHS EMS Branch and the National Native American EMS Association should promote the development of mutual aid agreements between neighboring Tribal governments and between Tribal governments and non-Native EMS agencies.
- A-8 ♦ Develop a long range plan for EMS delivery under the evolving self-governance program, with provisions for maintenance of clinical standards and accountability through such tools as performance based contracts.
- A-9 ♦ Provide education on the need for EMS to Tribal Councils, Service Units, Area Offices, IHS Headquarters, and Congress. This may be accomplished through cooperative efforts of the National Native American EMS Association, IHS EMS staff, IHS EMS Medical Director's Committee, and state EMS.

B. RESOURCE MANAGEMENT (B-1 thru B-7)
--

- B-1 ♦ **The IHS EMS Branch should develop a policy to mandate the development of a comprehensive EMS plan for the IHS that addresses all aspects of emergency care for all patients. This plan should be reviewed and revised on a regular basis.**
- B-2 ♦ The IHS EMS Branch should develop a policy that requires that EMS funding allocations be linked to an entity (e.g. Area Office, Tribal Government) meeting defined EMS standards.
- B-3 ♦ The EMS Branch should develop a plan that encourages the development of volunteer staffing, especially for first responder units in rural areas.
- B-4 ♦ **Each IHS Area Office should identify an EMS coordinator and adequately fund this essential position.**
- B-5 ♦ The EMS Branch should conduct studies to identify the

appropriateness of resource utilization throughout the entire EMS system.

- B-6 ♦ The EMS Branch should serve as a clearinghouse for IHS EMS activities nationally. For example, information dissemination on exemplary EMS programs and the acquisition of equipment from federal surplus sources.
- B-7 ♦ **The EMS Branch should encourage the integration of Native American EMS systems within regional/statewide EMS systems.**

C. HUMAN RESOURCES AND TRAINING (C-1 thru C-8)
--

- C-1 ♦ **The IHS EMS Branch should work with Area Offices, Service Units, and Tribes to conduct a comprehensive assessment of EMS training and EMS resources, as well as needs for EMS training and CME for all levels of EMS providers, including prehospital, clinic, and hospital medical personnel.**
- C-2 ♦ The IHS EMS Branch should fund a full time national IHS EMS Training coordinator, to plan and coordinate EMS Training programs in Cooperation with Area Office, Service Units, and Tribes.
- C-3 ♦ **The IHS EMS Branch should have a dedicated budget for EMS training activities that is adequate to meet the needs for training for all levels of EMS providers in the IHS and Tribal EMS programs.**
- C-4 ♦ The Black Hills Training Center should be preserved and should place a greater emphasis on training a cadre of EMS instructors for Native EMS programs.
- C-5 ♦ Native EMS programs should be integrated with state EMS training and certification programs. Wherever this is not feasible, prehospital EMS programs should maintain certification and re-certification from the National Registry of Emergency Medical Technicians.
- C-6 ♦ The IHS EMS Branch should foster improved coordination, legal recognition and memoranda of agreements between Tribal and state EMS programs.
- C-7 ♦ The IHS EMS Branch should provide adequate funding at the

national level for ATLS, ACLS, PALS, TNCC and other specialized emergency medical training courses for physicians and nurses in the IHS and tribal EMS systems.

- C-8 ♦ The IHS EMS Branch should work with Area Offices, Service Units, Tribes, and states to develop innovative programs for training and continuing education for prehospital, clinic, and hospital EMS providers. Consideration should be given to training provided through satellite video systems, teleconferencing, interactive training, and other technologies.

D. TRANSPORTATION (D-1 thru D-10)

- D-1 ♦ **The IHS EMS Branch would work with Area Offices, Service Units and Tribes to conduct a comprehensive nationwide needs assessment, including plans for strategic placement of ambulance services, first responder services, and air medical services.**
- D-2 ♦ **The IHS EMS Branch should have dedicated funding for the purchase or lease of ground ambulance and air medical resources, based on the comprehensive needs assessment.**
- D-3 ♦ The IHS EMS Branch should seek Congressional authority to purchase its own ambulances (separate from GSA) for those tribes that don't have adequate resources or capabilities to purchase or lease their own vehicles.
- D-4 ♦ The IHS EMS Branch should work with Area Offices, Service Units, and Tribes to explore other cost effective methods for innovative purchase or lease of ground and air ambulance resources.
- D-5 ♦ The IHS EMS Medical Director should work with Area Offices, Service Units, and Tribes to develop medically appropriate triage and transport protocols to ensure that transportation decisions are based on patient needs and cost effectiveness.
- D-6 ♦ The IHS EMS Branch Office should assist Tribal EMS programs to develop or improve billing and collection systems and a process should be established that ensures that most or all of these funds be used to enhance the emergency medical services.
- D-7 ♦ The IHS EMS Branch should assist Tribes in developing a process to obtain surplus government ambulances and medical equipment, and should encourage other government agencies to surplus

useable vehicles and equipment, rather than destroy them.

- D-8 ♦ The IHS EMS Branch should assist Tribes to develop air medical services meeting appropriate standards, if it can be shown that such services would improve patient care and access, and would be cost effective.
- D-9 ♦ The IHS EMS Branch should develop a comprehensive inventory of all Tribal ambulances, air medical services, and other EMS patient transportation resources.
- D-10 ♦ **The IHS EMS Branch should encourage all states to provide certification/licensure for Native American EMS agencies within their boundaries. (Reservations that cross state lines may need to develop appropriate agreements with each state to avoid the need for multiple licensure).**

E. FACILITIES (E-1 thru E-5)

- E-1 ♦ Uniform JCAHO accreditation for all facilities should be continued.
- E-2 ♦ **The IHS should institute the American College of Surgeons COT criteria for trauma care categorization.**
- E-3 ♦ The IHS Comprehensive EMS Plan must continue to assure that the facilities resources match the patient and health care needs of the service area.
- E-4 ♦ **Continue to develop or return to programs to enhance recruitment and retention of Health Professionals to include:**
- Native American health care health management scholarships;
 - Creative and positive continuing education and preceptor programs, and
 - Continuing access to and consistent funding for ATLS, ACLS, PALS, and RN trauma training programs.
- E-5 ♦ Develop formal and uniform treatment and transfer policies and agreements.

F. COMMUNICATION (F-1)

F-1 ♦ The EMS Branch should develop a communication plan as part of the comprehensive EMS planning process.

- The communications plan should inventory all existing means of citizen assess, dispatch facilities, EMS radio communications systems, including age and condition of the communications equipment.
- The communications planning process should include either radio communications engineering studies to determine the adequacy of coverage or, at a minimum, structured survey questionnaires for all EMS organizations serving Native Americans requesting information on adequacy of coverage by existing radio systems.
- The communications plan should identify solutions to the identified problems, including costs, and be used in the effort to obtain adequate funding resources to address EMS communications need for new approaches to solve identified EMS communications problems.

G. PUBLIC INFORMATION AND EDUCATION (G-1 thru G-8)
--

- G-1 ♦ There should be a major cooperative effort between IHS/EMS, local EMS Coordinators, and the National Native American EMS Association to educate Tribal Councils, Service Units, Area Offices, IHS Headquarters and Congress about the necessity for EMS and the positive impact it can have. This is particularly important due tot he extremely high injury fatality rate among the Native American population.**
- G-2 ♦ Accurate success stories should be well documented to highlight the benefits of EMS as well as injury prevention strategies and to assist EMS advocates in telling the EMS and Injury Prevention story.**
- G-3 ♦ The IHS EMS Branch should have sufficient resources to support public information and education activities, such as development and distribution of Public Information Assistance Packages for use by local EMS agencies, modifiable to better meet local needs, and regular publication of newsletter to share ideas and success stories among local EMS services**

and others who could benefit from such information. The newsletter may be a joint venture between the EMS and the National Native American EMS Association.

- G-4 ♦ Greater emphasis should be placed on First Aid or Bystander Care and CPR training for the public, which should be especially directed at school age children.
- G-5 ♦ Communication and coordination should be improved between IHS Injury Prevention Coordinators and local EMS Coordinators and IHS/EMS staff.
- G-6 ♦ Use of safety restraints and helmets as well as the “None for the Road” program in an effort to combat the major killer of young Native Americans should be aggressively promoted.
- G-7 ♦ Develop and implement effective programs to educate the public about appropriate EMS system access.
- G-8 ♦ EMS should share prehospital as well as trauma registry data to support injury prevention initiatives.

H. MEDICAL DIRECTION (H-1 thru H-5)

- H-1 ♦ **The EMS Branch should institute a policy that requires EMS medical directors for all prehospital EMS agencies.**
- H-2 ♦ **The IHS Director should designate an EMS Medical Director at the national level.**
- H-3 ♦ **The EMS Branch should redefine the responsibility and authority of the medical director at the Tribal, Service Unit, Area Office and National levels. Once defined, the medical director should be empowered with the authority to fulfill his or her responsibilities. The authority should include:**
 - suspension and revocation of clinical privileges;
 - assurance of compliance to existing clinical standards; and
 - execution of an effective quality improvement program.
- H-4 ♦ Each Service Unit should provide adequate orientation to all incoming IHS physicians in local and regional EMS systems.

- H-5 ♦ The IHS EMS Medical Director's Course should be mandatory for all designated EMS medical directors.

I. TRAUMA SYSTEMS (I-1 thru I-7)

- I-1 ♦ **The IHS should support the development of inclusive trauma systems in its service areas.**
- I-2 ♦ IHS hospitals and prehospital services should integrate into evolving trauma systems in their states and regions.
- I-3 ♦ Assessment of trauma care capabilities should be based on ACS-COT criteria.
- I-4 ♦ The IHS should increase its trauma prehospital resources to include:
- Access;
 - Bystander Training;
 - First Responder Training;
 - Ambulance
 - Prehospital Trauma Training;
 - Air medical integration; and
- I-5 ♦ Encourage all hospitals to participate in trauma quality improvement including:
- Trauma Registries;
 - Multidisciplinary Trauma Conferences; and
 - Morbidity and Mortality Conferences.
- I-6 ♦ Coordinate EMS injury prevention activities with existing EMS programs.
- I-7 ♦ Formalize existing triage and transfer patterns with protocols and policies.

J. EVALUATION (J-1 thru J-7)

- J-1 ♦ **The EMS Branch should reinstitute EMS Area Program Reviews.**
- J-2 ♦ The IHS EMS Medical Directors Committee should revise the evaluation tools for Area and Service Unit Program Reviews.
- J-3 ♦ The EMS Branch should initiate multidisciplinary Trauma Review in all Areas.
- J-4 ♦ Each Area should institute the use of a minimum data set EMS run report system, consistent with states systems wherever possible.
- J-5 ♦ The EMS Branch should promote the establishment and use of a Trauma Registry, to be integrated with state trauma registries wherever they exist.
- J-6 ♦ Each Area Medical Director should establish a formal run review process between local EMS medical director and providers.
- J-7 ♦ **IHS EMS should fund and establish EMS coordinators for each of the twelve Area Offices.**

APPENDIX B: TRIBAL EMS DATA SUMMARY

ELEMENTS—PART I	RESPONSES
YEAR:	
Program Name	
Service Unit	
Service Population	
Square Miles	
Total Runs	
Pediatric Runs (<18 yo)	
# First Responders	
# EMT- Basics	
# EMT- Intermediates	
# EMT- Paramedics	
# Instructor/Coordinators	
# Tribal Ambulances	
# GSA Ambulances	
Medical Director & Specialty	
Annual Operating Budget	
\$ from 638 contract	
\$ from Tribal General Fund	
Third Party \$ Billed	
Third Party \$ Collected	
Total Hrs OT, compensated	
Total Hrs OT, uncompensated	
Total Hrs Comp Time, used	
Total Hrs Comp Time, unused	

Person Completing these Data Elements: _____

How to contact you: _____

APPENDIX B, Page 2

ELEMENTS—PART II			
QUESTION	YES	NO	COMMENT
1. Are your ambulances “certified” in your state?			
2. Does your service participate in your state Trauma Registry?			
3. If yes, does the Registry provide you with an annual summary of data?			
4. Do you report all runs (turn in all run sheets) to your state EMS Bureau?			
5. If yes, does your state provide you with an annual summary of run data?			
6. Does your service have its own Critical Incident Stress Debriefing (CISD) team?			
7. Has your service ever utilized the Needs Assessment of the EMSC Program from its National Resource Center?			
8. Has your service ever utilized the EMSC Guidelines for Pediatric Equipment for BLS &ALS Ambulances?			
9. Do you have an active Quality Improvement Program?			
10. If yes, is your Medical Director an active participant?			
11. Does your service participate in Child Fatality Review Committee?			
12. What is your area of GREATEST NEED?			

APPENDIX C - GRAPHS

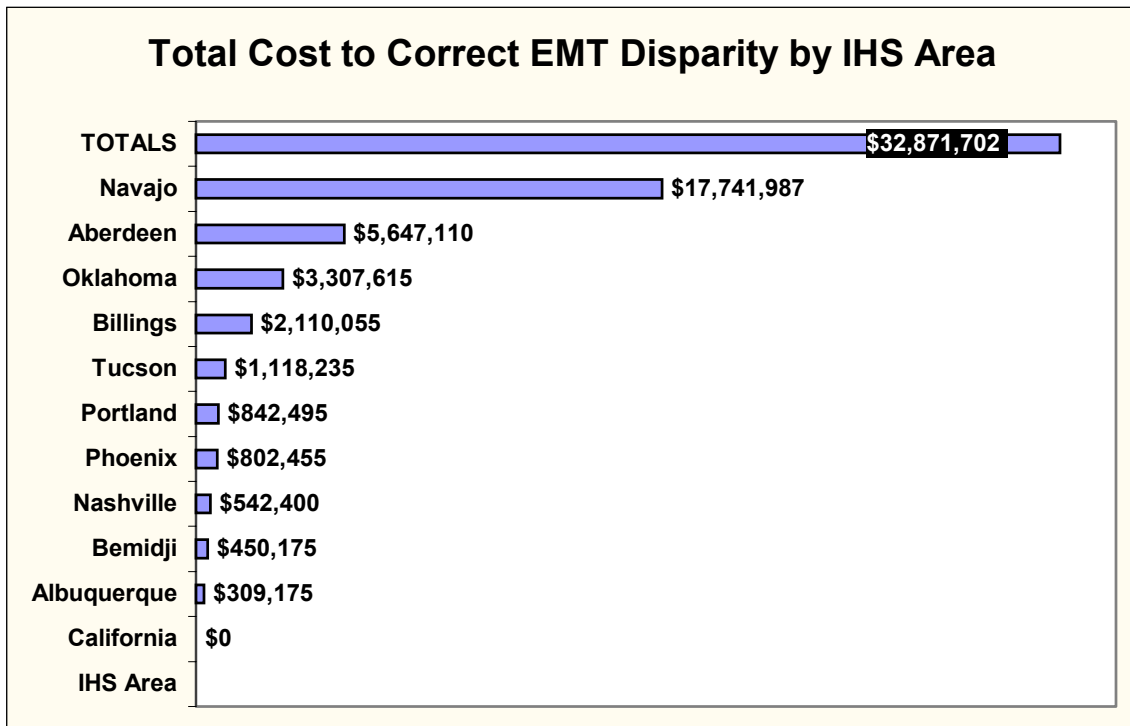


Figure 9 - Total Costs to Correct EMT Disparity

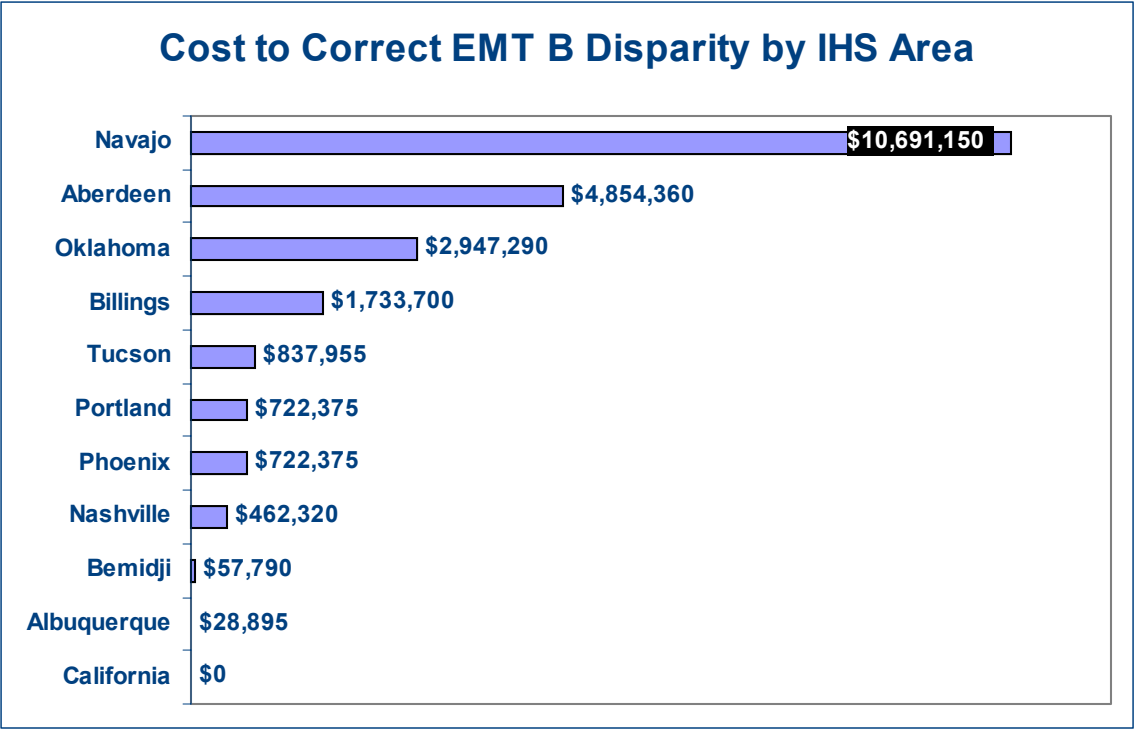


Figure 10 - Cost to Correct EMT Basic Disparity

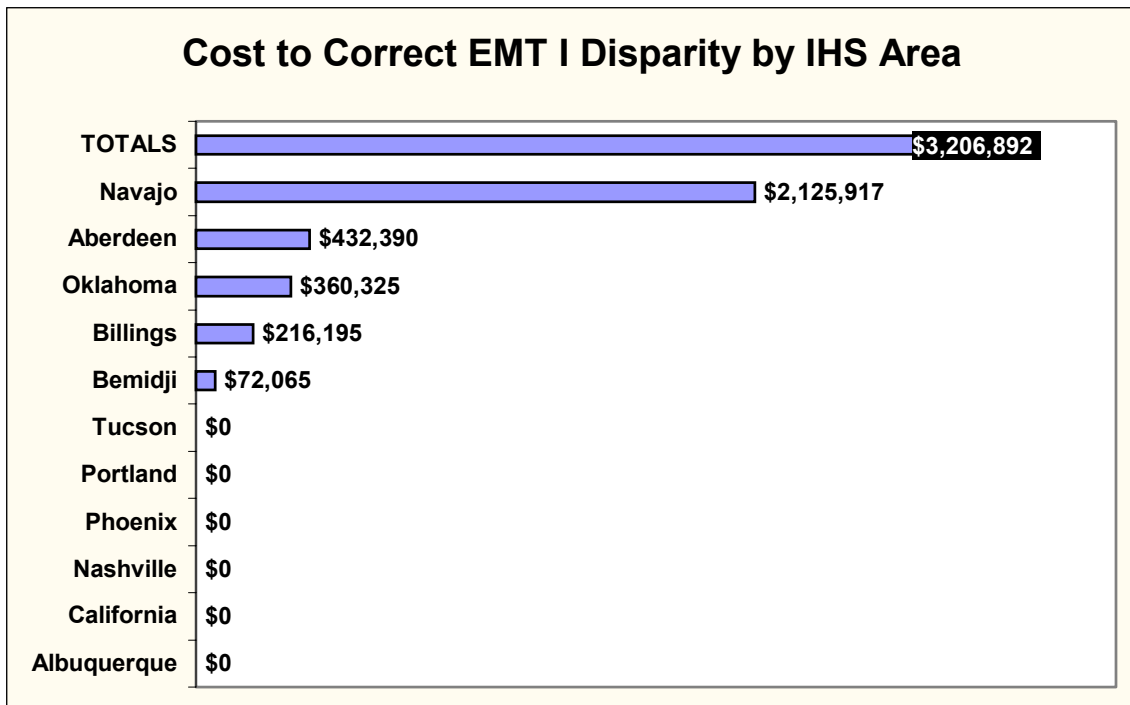


Figure 11 - Cost to Correct EMT Intermediate Disparity

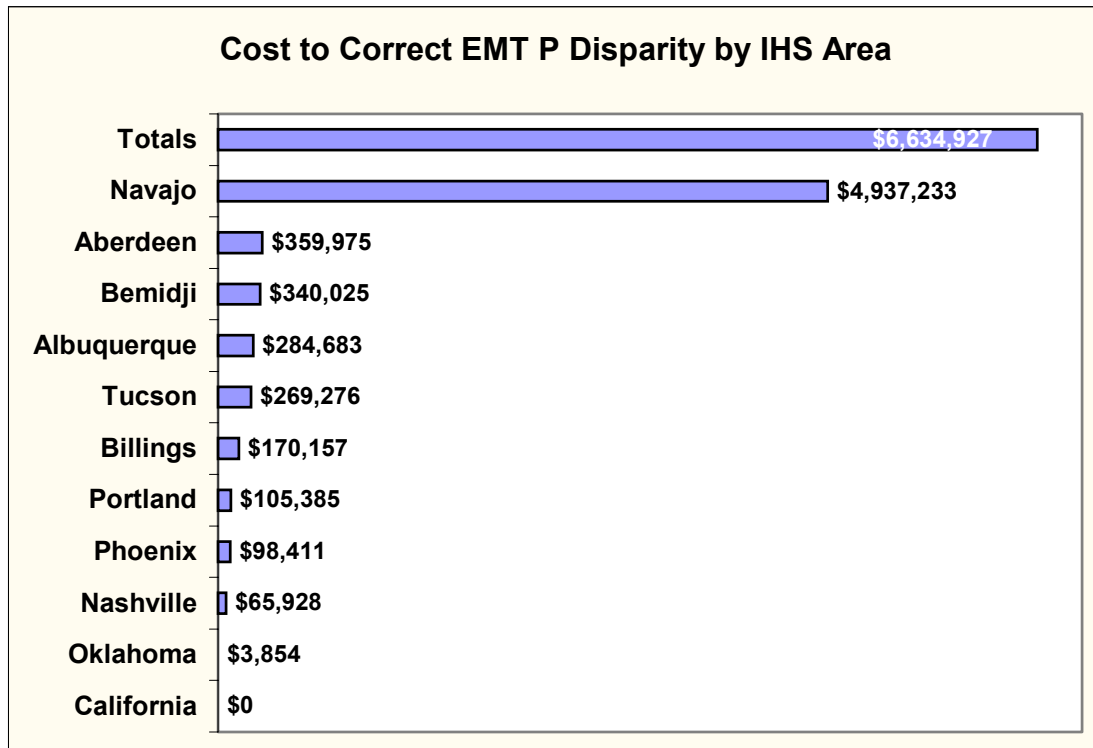


Figure 12 - Cost to Correct EMT Paramedic Disparity

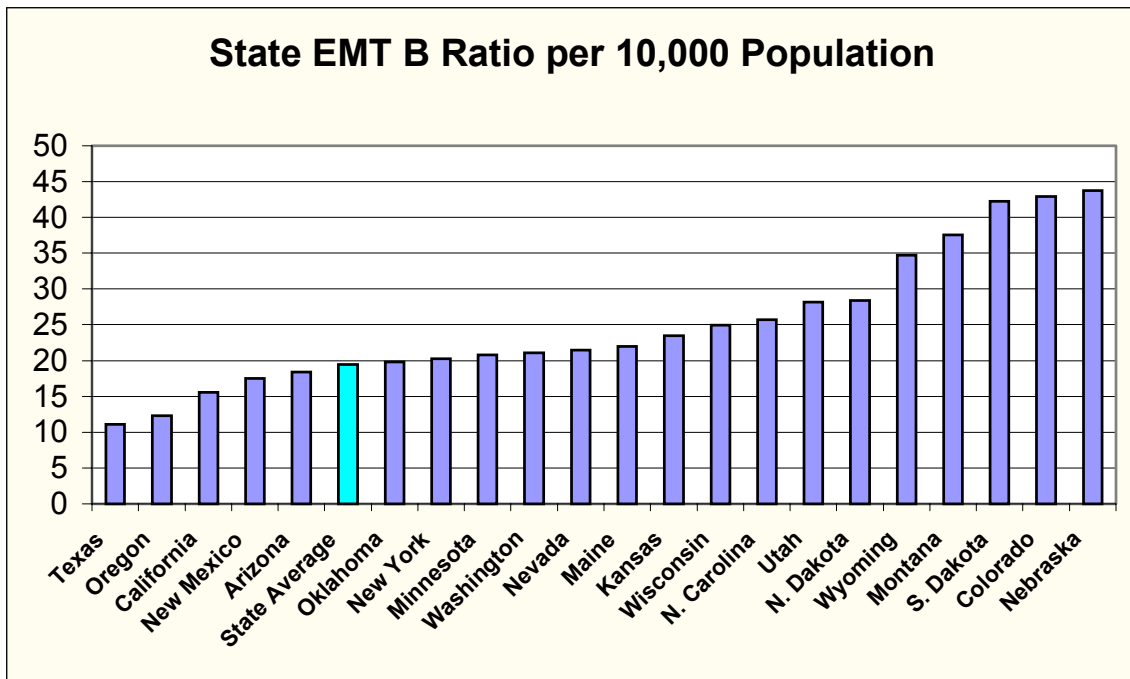


Figure 13 - State EMT B Ratio per 10,000 Population

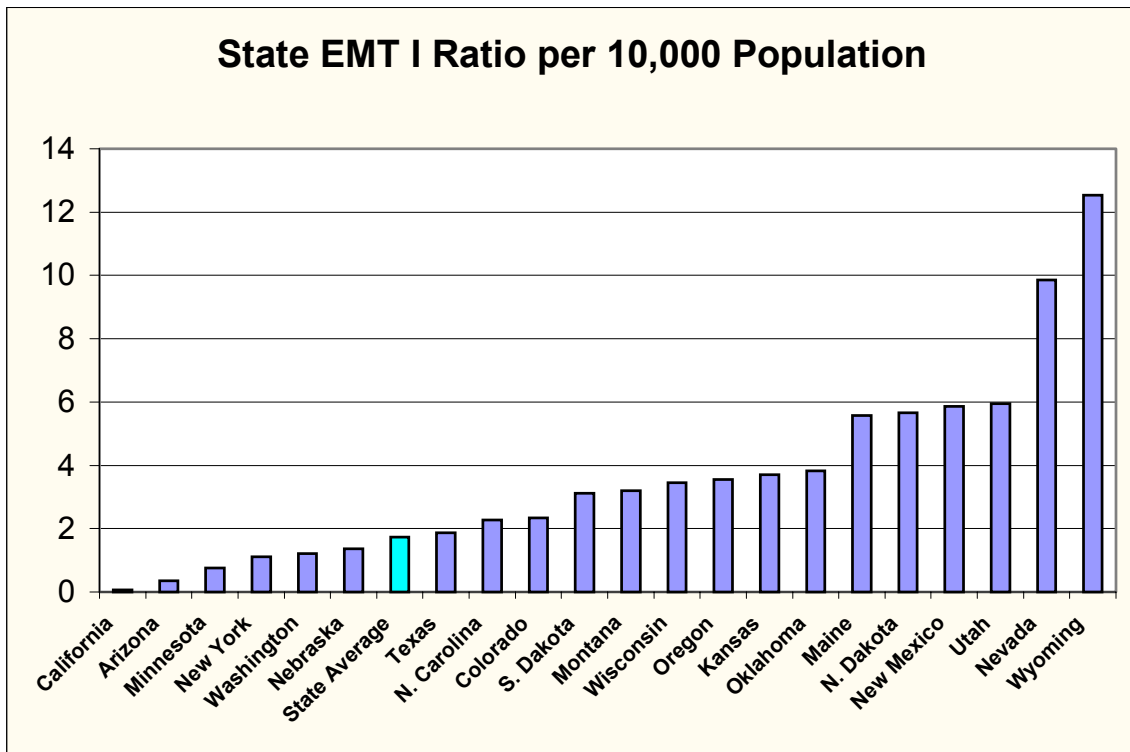


Figure 14 - State EMT I Ratio per 10,000 Population

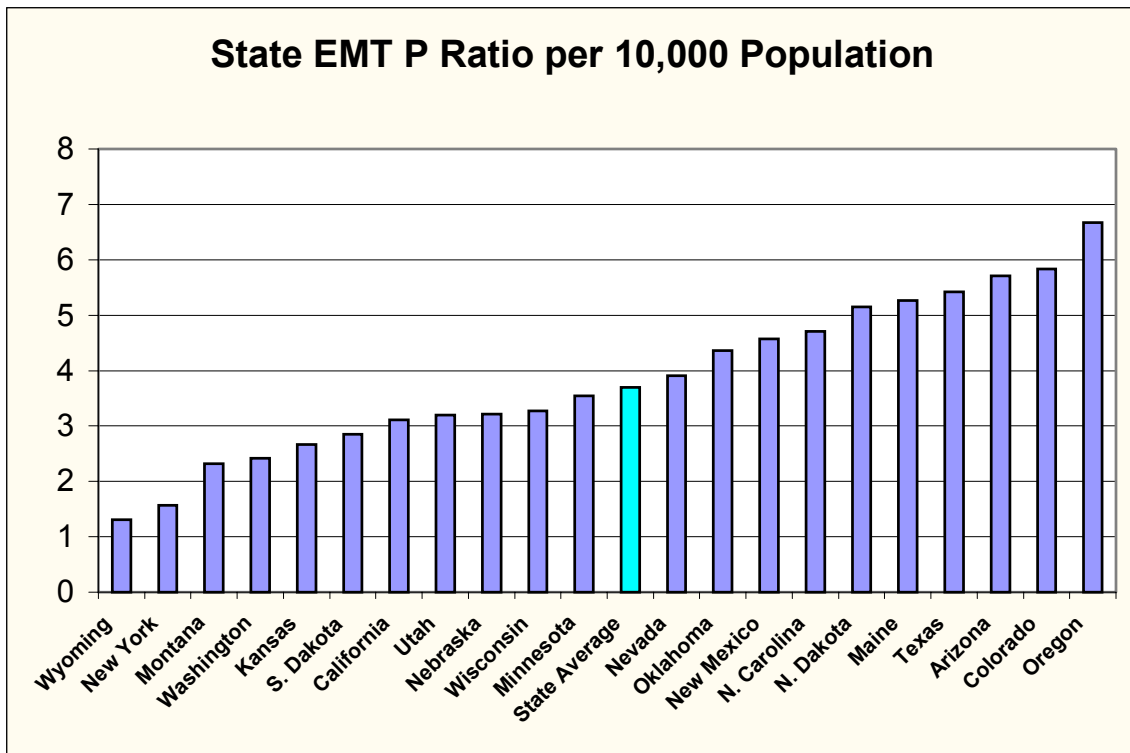


Figure 15 - State EMT P Ratio per 10,000 Population

BIBLIOGRAPHY

- ¹ Short, D. *Assessment of the Capabilities of American Indian Tribal Emergency Medical Services to Address EMS for Children*. DHHS/IHS and DOT/NHTSA Inter-Agency Agreement, 1998.
- ² Anderson, P. et al. *IHS, An Assessment of Emergency Medical Services*. National Highway Traffic and Safety Administration, Technical Assistance Team. 1993.
- ³ Trujillo, M. *Correspondence* to National Native American EMS Association. April 16, 1997.
- ⁴ *Emergency Medical Services Agenda for the Future*. DOT/NHTSA and HRSA/MCHB. August 1996.
- ⁵ Baker, SP, Whitfield, MS, and O'Neill, B. *Geographic Variations in Mortality from Motor Vehicle Crashes*. New England Journal of Medicine 316(22):1384-1387. May 28, 1987.
- ⁶ Fox, CE. *Remarks: Integrating EMS Into Rural Health Systems*. DHHS, HRSA. December 13, 1999.
- ⁷ *Rural and Frontier Emergency Medical Services Toward the Year 2000. Analysis and Policy Recommendations*. National Rural Health Association. May, 1997.
- ⁸ *Tribal EMS/Ambulance Program Directory*. Mountain Plains Health Consortium. www.heds.org/ambprog 10.pdf. 2000.
- ⁹ *Regional Differences in Indian Health, 1998-1999*. DHHS, IHS, OPH, Program Statistics Team.
- ¹⁰ Wallace, D. *Injuries Among American Indian and Alaska Native Children, 1985-1996, Preliminary Data*. DHHS, CDCP, National Center for Injury Prevention and Control. April, 2000.
- ¹¹ Gover, K. *Remarks at the Ceremony Acknowledging the 175th Anniversary of the Establishment of the Bureau of Indian Affairs*. September 8, 2000.
- ¹² Mason, V. *Generational Grief: Continuing a Cycle of Illness*. Annual Fall Meeting of the Intermountain Regional EMSC Coordination Council, Tucson, Arizona. September 14-17, 2000.

-
- ¹³ Decker, P. *Annual Records*, FY 1988-2000. IHS/GSA Shared Cost Ambulance Program. Office of Public Health Programs, IHS.
- ¹⁴ IHS/CHS Fiscal Intermediary. *CHS Patient Transportation Report*, Purchase Order Fiscal Years (POFYs) 1995-1999.
- ¹⁵ Emergency Medical Services Branch (HGA529). Division of Clinical and Preventive Services (HGA529), Headquarters Functions and Services Summary, FY1997.
- ¹⁶ *Final IHS User Population Estimates, FY 1984-1998*. Memoranda. IHS, Office of Public Health, Program Statistics Team, 1995-2000.
- ¹⁷ *California EMS Study: A review of unmet rural needs and alternatives*. State of California, EMS Authority. EMSA No. 392-05. March, 1992.
- ¹⁸ Gibbens, B. and Olson, D. *Rural EMS: State Issues and Responses*. University of North Dakota Rural Health Research Center. 1994
- ¹⁹ *A Community Development Guide for Emergency Medical Services: A Systematic Approach to Funding and Administration*. Oklahoma Agricultural Experiment Station Project No. 1921, MP-126. July 1988.
- ²⁰ Perkins, KB, Ballweg, JA, and Dyer, DA. *An Exploration of a Partnership Concept for Staffing Rural Virginia Emergency Medical Squads*. Virginia Polytechnic Institute and State University. February, 1989.
- ²¹ *Emergency Medical Services Systems, Program Guidelines*. Department of Health, Education, and Welfare Publication No. 79-2002. 1979
- ²² Rural Emergency Medical Services, Special Report. Office of Technology Assessment, Congress of the United States. 1989.
- ²³ *Success and Failure: A Study of Rural Emergency Medical Services*. A Report to the Office of Rural Health Policy. National Rural Health Association. 1990.
- ²⁴ United States Census Bureau. www.census.gov
- ²⁵ Final IHS User Population Estimates, FY 1984-1998. Memoranda. IHS, Office of Public Health, Program Statistics Team, 1995-2000.
- ²⁶ *General Services Schedule, GS 2000*. US Office of Personnel Management. Effective 1-2-2000.
- ²⁷ Mayfield, Ty. *2000 JEMS Salary Survey*. Journal of Emergency Medical Services, 2000;5(9):48-53.

²⁸ Committee on Trauma, American College of Surgeons. www.acs.org.

²⁹ *EMS: Equipment for Ambulances*. Policy Compendium of the American College of Emergency Physicians. 2000.

³⁰ Federal Specifications for Ambulances, KKK-A-1822D.

³¹ *Guidelines for Pediatric Equipment and Supplies for Basic and Advanced Life Support Ambulances*. Committee on Ambulance Equipment and Supplies, NERA, *Annals of Emergency Medicine*, 1996;28:699-701.

³² *Guidelines for Pediatric Equipment and Supplies for Basic and Advanced Life Support Ambulances*. Committee on Ambulance Equipment and Supplies, NERA, *Annals of Emergency Medicine*, 1996;28:699-701.